

1. *Mosque in the Berber village of Douirat*

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FEBRUARY 1945

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Information subsequent to the Allied landings in French North Africa is generally excluded from this volume.

PREFACE

IN 1915 a Geographical Section was formed in the Naval Intelligence Division of the Admiralty to write Geographical Handbooks on various parts of the world. The purpose of these handbooks was to supply, by scientific research and skilled arrangement, material for the discussion of naval, military, and political problems, as distinct from the examination of the problems themselves. Many distinguished collaborators assisted in their production, and by the end of 1918 upwards of fifty volumes had been produced in Handbook and Manual form, as well as numerous short-term geographical reports. The demand for these books increased rapidly with each new issue, and they acquired a high reputation for accuracy and impartiality. They are now to be found in Service Establishments and Embassies throughout the world, and in the early years after the last war were much used by the League of Nations.

The old Handbooks have been extensively used in the present war, and experience has disclosed both their value and their limitations. On the one hand they have proved, beyond all question, how greatly the work of the fighting services and of Government Departments is facilitated if countries of strategic or political importance are covered by handbooks which deal, in a convenient and easily digested form, with their geography, ethnology, administration, and resources. On the other hand it has become apparent that something more is required to meet present-day requirements. The old series does not cover many of the countries closely affected by the present war (e.g. Germany, France, Poland, Spain, Portugal, to name only a few); its books are somewhat uneven in quality, and they are inadequately equipped with maps, diagrams, and photographic illustrations.

The present series of Handbooks, while owing its inspiration largely to the former series, is in no sense an attempt to revise or re-edit that series. It is an entirely new set of books, produced in the Naval Intelligence Division by trained geographers drawn largely from the Universities, and working at sub-centres established at Oxford and Cambridge, and is printed by the Oxford and Cambridge University Presses. The books follow, in general, a uniform scheme, though minor modifications will be found in particular cases; and they are illustrated by numerous maps and photographs.

The purpose of the books is primarily naval. They are designed first to provide, for the use of Commanding Officers, information in

a comprehensive and convenient form about countries which they may be called upon to visit, not only in war but in peace-time; secondly, to maintain the high standard of education in the Navy and, by supplying officers with material for lectures to naval personnel ashore and afloat, to ensure for all ranks that visits to a new country shall be both interesting and profitable.

Their contents are, however, by no means confined to matters of purely naval interest. For many purposes (e.g. history, administration, resources, communications, &c.) countries must necessarily be treated as a whole, and no attempt is made to limit their treatment exclusively to coastal zones. It is hoped therefore that the Army, the Royal Air Force, and other Government Departments (many of whom have given great assistance in the production of the series) will find these handbooks even more valuable than their predecessors proved to be both during and after the last war.

J. H. GODFREY

Director of Naval Intelligence

1942

The foregoing preface has appeared from the beginning of this series of Geographical Handbooks. It describes so effectively their origin and purpose that I have decided to retain it in its original form.

This volume has been prepared by the Oxford sub-centre of the Naval Intelligence Division under the direction of Lieut.-Colonel K. Mason, M.C., M.A., R.E., Professor of Geography in the University of Oxford, and is the work of a number of contributors, whose names are given on pages 483-484.

E. G. N. RUSHBROOKE

Director of Naval Intelligence

FEBRUARY 1945

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NOTE

English equivalents are normally given for all metric figures, with the exception of metric tons (1 metric ton = 0.984207 ton).

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CHAPTER I

INTRODUCTION

Area, Boundaries, and Population

TUNISIA is a small country of 48,332 square miles, about the size of England (Figs. 1, 2), a French protectorate adjoining Algeria and a topographical prolongation of eastern Algeria, from which it is separated by an arbitrary administrative boundary. The eastern boundary is with Libya: the dividing line here follows a physical feature, but bears no relationship to tribal or racial distribution or to communications.

The population is a little over 2,600,000, of which over 90 per cent. are natives, most of them Moslems, but including about 60,000 Jews. Of the Europeans rather more than 100,000 are French by birth or naturalization, and rather less than 100,000 are Italians, who form an important and, at times, difficult element in the population; there are between 7,000 and 8,000 Maltese and less than 4,000 other Europeans.

Relief, Climate, and Vegetation

The country is divisible into three parts, northern, central, and southern (Fig. 9). In *northern Tunisia* the well-forested mountains, or Tell, are the extension of the folded chains of eastern Algeria: they dominate and define the rugged north coast from the boundary to Bizerta; on their southern flank lies the great corridor of the Oued Medjerda. The river flows through wild gorges from its source in eastern Algeria into wide and fertile plains, to enter the Mediterranean in the Golfe de Tunis. Low, undulating, well-cultivated ground with isolated mountains, the Lower Tell, extends from Tunis northward to the great naval port of Bizerta, situated where an inland lake is joined to the sea by a narrow channel. Similar country also lies south-eastward of Tunis and is prolonged in the prominent Cap Bon peninsula.

Inland lies the high and rather barren mountainous belt, the High Tell, of *central Tunisia*, south of the Medjerda and extending westward into Algeria. Mesozoic limestones are predominant, whereas Tertiary sandstones support the forests of northern Tunisia. The rocks are folded and arranged in domes, many of them faulted,

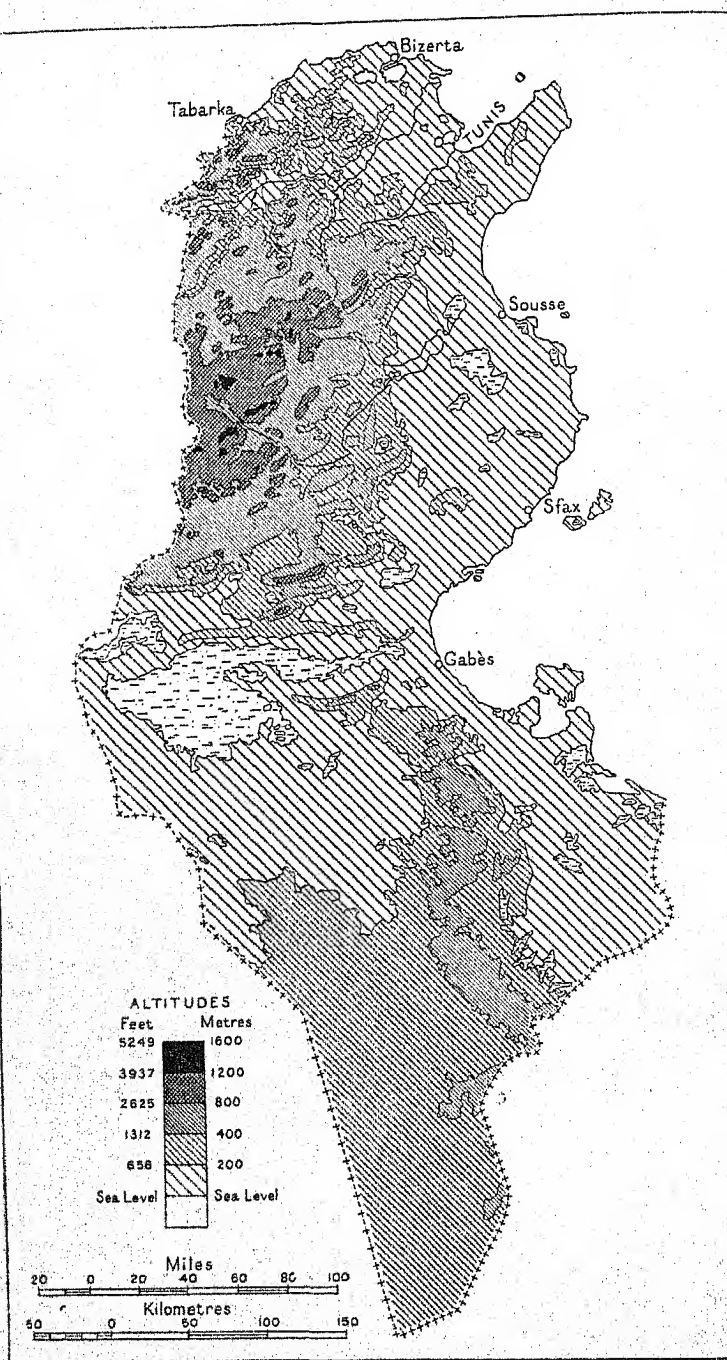


FIG. 1. Relief

separated by depressions and basins, the main structures running approximately north-east to south-west. The southern boundary of the High Tell is a great chain of summits, the Zeugitane, broken by valleys and plains, that crosses the whole width of the country; it

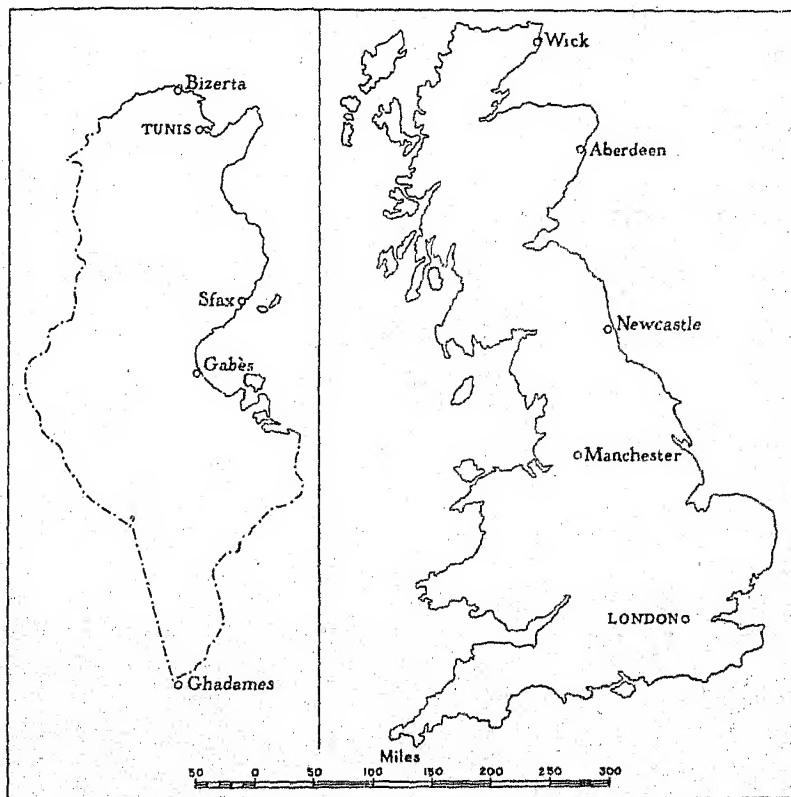


FIG. 2. *Comparative size of Tunisia and Great Britain*

forms the 'Dorsale' or 'Backbone' of Tunisia. South of the Dorsale are numerous chains and hill groups, domes separated by wide plains among which the drainage fails to reach the sea; the valleys fan out in plains and depressions where the seasonal surface flow of the rivers is absorbed or evaporated in *sebkhas* or salt marshes. So, towards the south-east, the country passes into dreary steppes, barren except where water maintains some vegetation or where irrigation makes agriculture possible. High steppes, where hills and uplands rise above

high open plains, give place towards the south and east to low steppes, where the monotonous landscape is but little broken by hills: some detached hills running from north to south mark the passage from the High to the Low Steppes. Near the east coast the Low Steppes pass into the Sahel, where extensive olive-groves have been planted. The east coast, south of Cap Bon, is low and monotonous and the sea extremely shallow. The southern part of central Tunisia is marked by prominent mountain groups, domes alined east-west, which stand on the threshold of the desert.

Southern Tunisia is essentially Saharan. In the north, partly below sea-level, lie the great *chotts*, el Rharsa, Djerid, and el Fedjadj, extensive salt lakes and salt marshes, on the borders of which artesian wells irrigate oases containing many thousands of date-palms. Beyond, to the south, lies desert where the folds of the Atlas are replaced by almost horizontal rocks of Mesozoic age, with some water-holes, extensive sand-dune areas (the eastern part of the Great Eastern Erg), and few inhabitants. To the east rise the foothills (Dahar) of the flat-topped *Monts des Ksour*, which run southward from the coastal plain or Arad near Gabès. A monotonous coastal plain, the *Djeffara*, runs along the northern flank of the escarpment to the Libyan frontier. The coast itself is featureless and the sea very shallow: the well-populated and prosperous *Île de Djerba* is separated from the mainland by a shallow strait.

The climate of Tunisia is Mediterranean in the north, steppe-like in the centre, and Saharan in the south, modified by the presence of the sea on the east and mountains and high plains in the west (Figs. 19-23). There are only two main seasons, winter (October to April) and summer (May to September): spring and autumn are no more than short transitional periods.

In the winter the Sahara is colder than the Mediterranean and is a high-pressure area; in summer the relationship is reversed. Winter winds are generally from the west and north-west and bring rain, the weather being cold and sometimes bleak and wet, but often sunny and generally resembling that of southern Europe: winds and rainfall vary locally and from year to year. During the hot summer, winds blow towards the Saharan low-pressure areas, usually from the north-east or east; rain is limited to a few violent storms. The winds are increasingly strong and dry towards the south, cloud and rain being rare. Occasionally an excessively hot and dry south wind, the *sirocco*, blows from the Sahara. The mean annual rainfall decreases from 30 inches or more on the north coast to 4 inches or less in the south.

There are marked differences between the climate of the interior and of the coasts. Especially in the northern mountains the winter may be bitterly cold, with much rain and wind, and frost and snow in the mountains; in the steppes it is cold and windy, with showers of heavy rain but considerable sunshine. The coasts are milder than the interior, and the east coast generally less bleak than the north. The summer is hot in the interior, excessively so in the south: it is hot also on the coast, but considerably cooler than in the interior. The proximity of the sea leads to land- and sea-breezes in the warm season, especially on the east coast, but it also gives rise to high humidity which, with high temperature, is particularly enervating for Europeans. The high humidity and heavy dews of the east coast make possible olive-growing and dry farming.

The natural vegetation of Tunisia closely reflects the relationship of geology, relief, and climate. Three regions are recognizable, the Mediterranean, the Saharan, and an intermediate transitional area (Figs. 25, 26).

In the Mediterranean region the mountain belt of north-western Tunisia supports extensive cork-oak forests and in the valleys ash, elm, poplar, and other trees familiar to Europeans. The drier areas of the Medjerda basin with the plain of Mateur have stands of Aleppo pine and widely distributed low forests and brushwoods of olive-lentisk and shrubs. In the wetter and more mountainous districts of north-eastern Tunisia Aleppo pine flourishes, and in the drier districts there are thuya woodlands with olive-lentisk and jujube brushwoods: the vegetation as a whole is in keeping with that of the Atlas throughout Barbary.

In the intermediate transitional region the vegetation of the Atlas gives place to that of the Sahara, the rainfall decreasing from 16 inches in the north to between 6 and 8 inches near the great chotts. The Aleppo pine and holm-oak forests of the mountainous north-western part of the area give place towards the south and east to a steppe vegetation of herbs and grasses (including alfa), which become progressively more sparse.

The Saharan region, in many years almost rainless, is essentially desert, apart from the high Monts des Ksour, where there are considerable areas of alfa steppe. Parts of the desert, however, support perennial trees and betoum, jujube, and other shrubs, with an ephemeral vegetation of herbs. In the oases there are date-palms and other trees and plants that can thrive in heat with a sufficiency of water.

History and People

The first permanent settlements in Tunisia were established by Phoenician merchants from the Levant between the eleventh and ninth centuries B.C.: some of these trading stations grew into considerable towns, notably Carthage. In the eighth century bitter rivalry developed between the Phoenicians and Greeks for the control of the central and western Mediterranean, and for 400 years the Carthaginians waged wars to maintain the monopoly of trade against Greek and, later, Roman attacks. These wars culminated in the obliteration of the city of Carthage by the Romans in 146 B.C. The Romans then retained a small coastal zone in Africa which later grew into the province of Africa Proconsularis, embracing the whole of modern Tunisia with the north-eastern corner of Algeria. The Latin tongue and Christianity were introduced, and peace and prosperity ensued until the third and fourth centuries A.D. With the disintegration of the Roman Empire, however, the Vandals were able to conquer the country in A.D. 439, but in 533 it was rescued from barbarian hands by Belisarius, who was sent to Tunisia by Justinian, the Byzantine Roman Emperor.

The new Moslem Empire established in Syria and Egypt began to expand westward during the seventh century, and all Byzantine and Berber resistance in Tunisia was crushed in the years following the foundation of Kairouan in 670. Islam and Arabic gradually replaced Christianity and the Berber, Punic, and Latin tongues, and Tunisia shared more and more in the political and religious storms of the Moslem world. The old prosperity largely disappeared and the country was ruled successively by the Aghlabite, Fatimite, Hilalian, Almohad, and Hafsate dynasties until the sixteenth century. In 1512 a Turkish pirate, Aroudj, established himself on the Île de Djerba and with his brother Barbarossa raided the shores of Africa and Europe, and ejected the Hafsate prince from Tunis. The Spanish helped to reinstate the prince, but were too occupied elsewhere to maintain their position in north Africa, and in 1574 Tunis was occupied by the Turks.

Tunisia was made a province of the Ottoman Turkish Empire, from which it gradually became virtually independent, though retaining its Ottoman organization under a *pasha*. The present reigning dynasty in Tunisia was founded in 1705 when the Bey Hussein ben Ali was recognized as *pasha-bey* and his family became hereditary rulers of the country. Under them relations with Europe improved, piracy diminished, and many reforms were instituted. In course of

time, however, the country fell into debt through accepting excessively large loans from France at exorbitant rates of interest, and, although nominally under allegiance to Turkey, fell increasingly under French influence. During the nineteenth century the French strengthened their position in Tunisia, especially after the occupation of Algeria in the years following 1830. Finally they decided on armed occupation and in 1881 overran the country in a few weeks and dictated terms to the Bey at Kassar Said. By this treaty the Bey remained the nominal head of the country, but there was to be a French Resident and a French army in occupation. These terms were confirmed by the Treaty of la Marsa in 1883.

Since 1881 there has been an effective French protectorate, and the Bey has lost most of his powers. The Franco-Italian rivalry which began in the nineteenth century has persisted, despite conventions, protocols, and agreements. During the present century, and particularly since 1918, there has been a rise of nationalism among the native population, especially the educated section of it, which has presented the French authorities both in Tunisia and in Paris with a succession of difficult situations.

During most of its history, therefore, Tunisia has faced east and turned its back on Algeria. The Phoenicians, the founders of Carthage, and the Arabs, who brought Islam, came from the east: the Romans and the French introduced western civilization. To-day the natives, who are far more arabized than the people of Algeria and Morocco and strongly attached to their traditions, seek inspiration from the east, particularly Egypt, rather than from the west. Though they are commonly referred to as 'Arabs' or 'Berbers', neither term is usually correct. Most of them are Berbers who have already absorbed, or are assimilating, the many immigrants from the Carthaginians to the Arabs who have entered their country. The Arabs have so completely mixed with the stock already in the country that it is difficult to distinguish berberized Arabs from arabized Berbers: all are Moslems, and many centuries of living together have blended the two races. There are, however, groups dominantly Arab and centres of Berber population, together with mixed Hamitic peoples, especially in the oases of the south (Fig. 29).

Jews have lived in Tunisia for many centuries. To-day there are about 60,000 of them scattered in colonies in the towns, where they are not segregated: only in the Île de Djerba and in Gabès do they live apart. Unlike the Jews of Algeria, they have never held French citizenship as a corporate body.

Generally distinct from the native population described above are the French and Italians, who have for the most part been attracted to the country during the last eighty or ninety years. The French form the aristocracy of the European population and are very largely employers of labour and owners of property. The Italians provide a class of hard-working peasants and artisans, together with a comparatively small body of educated and professional men; for political and economic reasons they are disliked by the French and the natives, and form a closely knit and organized state within a state. There are also a few thousand other Europeans, mainly Maltese, Greeks, and Spaniards: these groups are tending to disappear as the naturalization laws are applied.

Administration

The administration of Tunisia is an intricate mixture of Turkish government and Moslem law on the one hand and French organization, legislation, and law on the other. Before the Treaty of Kassar Said (1881) Tunisia was in effect a Regency or province of the Turkish Ottoman Empire, of which the Bey had become absolute monarch. The Bey was assisted by a small cabinet, and tribal government was in the hands of *caids* (chiefs) appointed by himself and assisted by *khalifas* (lieutenants) and *kahias* (cadets). Moslem law of the Hanifite and Malekite rites was in force. Nominally this system remained operative after the French occupation, but since 1881 the French have governed according to circumstance through the Bey, in his name, or direct as the protecting power. The essential legal background which gave the French a free hand is to be found in the Treaty of la Marsa (1883) whereby the Bey engaged to make 'such administrative, judicial, and financial reforms as the French Government considers useful'.

The Bey still has his own ministers, but almost every action needs the approval of the French Resident-General or his representative French official. The country is divided into regions or provinces under French officials, and the military territory (*Territoires militaires du Sud*) under French control. The regions are subdivided into districts or civil controls, with French controllers, and then again into *caidats* and lesser divisions (Figs. 31, 32). The *caids*, nominally appointed by the Bey, are the link between the French Government and the natives; though they have considerable responsibility, their powers are strictly limited.

In Paris the administration of Tunisia is centred in the French

Foreign Office, to which the Resident-General in Tunisia is responsible: he is also the Bey's Minister of Foreign Affairs, and in fact controls all foreign affairs. He is assisted by a Council of Ministers, composed of the Bey's three Tunisian Ministers and the French heads of departments and senior officers of the Tunisian Government (in all a dozen Frenchmen). Similarly throughout the whole chain of government and administration the system of Beylical authority is totally controlled and supervised by a highly centralized French official staff (Fig. 33).

Law and order are in a similar state of French tutelage. The law of Tunisia is French law grafted on a native stock: the Moslem law of real property has been modified but not abolished; land tenure is an adaptation of the Torrens system. The native courts administer Moslem law, but in the lay courts it is supplemented by French codes (Fig. 34). The law of France and French courts do not apply in Tunisia, but they become legal by Beylical decree and re-enactment in the Protectorate. In all except purely French affairs the sole source of legislative authority in the country is nominally the Bey.

Economic Resources

Tunisia possesses valuable and varied mineral resources, but is predominantly an agricultural country (Figs. 55-61). Nearly all the natives are farmers, and the French Government has encouraged agricultural colonization by Europeans for many years, though its efforts have resulted in the establishment of more Italian peasants than Frenchmen on the land. The main cereal crops grown are wheat and barley, substantial quantities of which are exported in normal years. The olive, however, dominates Tunisian agriculture: there are at least 19 million trees in the country, particularly in the Sahels of Sousse and Sfax, and in a good year more than 60,000 tons of olive-oil may be produced. There are also extensive vineyards in north-eastern Tunisia, and citrus and other fruits, early vegetables, and market-garden produce are grown on a considerable scale. Alfa grass is gathered on the steppes and exported as esparto, mainly to the United Kingdom, for the making of high-quality paper. Livestock are reared throughout the country, particularly sheep, goats, cattle, and donkeys, with camels in the south. The principal forest product is cork obtained from the comparatively wet districts of north-western Tunisia.

The chief minerals produced are phosphate, iron ore, lead, and zinc (Figs. 62-66). Tunisia is, after the U.S.A. and the U.S.S.R.,

the world's largest producer of natural phosphate, with between 13 and 14 per cent. of the total output. Immediately before the present war Tunisia was producing about 1,800,000 tons of phosphate per annum, most of which was exported in its natural state to France, the United Kingdom, Italy, the Netherlands, and elsewhere: some, however, remained in the country and was manufactured into super-phosphate, a valuable fertilizer. The annual export of iron ore was rather less than 1 million tons per annum. Apart from mining, industry has so far developed on only a small scale, mainly because of the extreme poverty of the country's supplies of fuel.

Metropolitan France dominates the trade of Tunisia, taking about three-fifths of the exports and supplying a similar proportion of the imports. Other countries trading with Tunisia include Algeria, the United Kingdom, the U.S.A., and Italy. Agricultural products account for over 60 per cent. of the total exports: most of these go to France with the exception of esparto and some of the olive-oil. Minerals account for the bulk of the remainder: France again is the principal customer, except for iron ore, about two-thirds of which comes normally to the United Kingdom, one-tenth of whose total supplies of iron ore are drawn from Tunisia. The imports consist mainly of manufactured goods, especially textiles, machinery, food-stuffs, coal, and petroleum. The United Kingdom, the U.S.A., Algeria, Italy, Roumania, and the Netherlands, besides France, share in this trade.

Most of the foreign trade is handled by the ports of Tunis (with la Goulette), Sfax, Sousse, and Bizerta, all of which had before the present war modern equipment and good accommodation; Bizerta, besides being a commercial port, is the main naval base in French North Africa. These four ports are also the largest towns in Tunisia: apart from them only the ancient religious centre of Kairouan and the entirely native and agricultural settlement of Msaken in the Sahel of Sousse have more than 20,000 inhabitants. There are nine other towns with populations exceeding 10,000. Whereas seven out of every ten Europeans in Tunisia live in urban areas, the natives provide the majority of the rural community, which represents 77·6 per cent. of the country's total population.

Communications

The Tunisian main road system has been almost entirely rebuilt since 1919 and is, therefore, of modern construction: there is also an extensive network of secondary roads and tracks. The main routes of

the country radiate from three coastal areas, Tunis and Bizerta, Sousse and Sfax, and the Gabès district (Fig. 70). There is also a good coast road from Tunis through Grombalia, Sousse, Sfax, and Gabès to Médenine and the Mareth defences.

The roads radiating from Tunis and Bizerta are in large measure confined to the coast, river valleys, and mountain passes, and have considerable engineering works. Thus of the three good roads running towards Algeria, one strikes westward through the mountains to the north coast at Tabarka and two converge on Medjez el Bab, whence one follows the Medjerda valley and the other passes over mountain and valley country to le Kef: these two roads unite at Souk Ahras in Algeria.

The roads leaving the Sousse-Sfax area traverse the open Sahel and Low Steppes to passes in the mountains of the Dorsale and High Steppes, and thence into eastern Algeria. The main road runs from Sousse via Kairouan and Maktar to le Kef and so to Souk Ahras. Others lead from Sousse and Sfax to Sbeitla, whence there are routes to le Kef and, through Kasserine and Fériana, to Tébessa in Algeria.

From Gabès there is a good road leading inland through country similar to that described above to Gafsa, whence there are routes to Fériana and to the oases and palm-groves of Tozeur and Nefta.

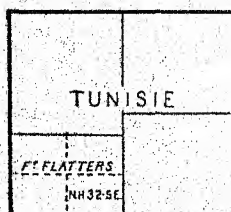
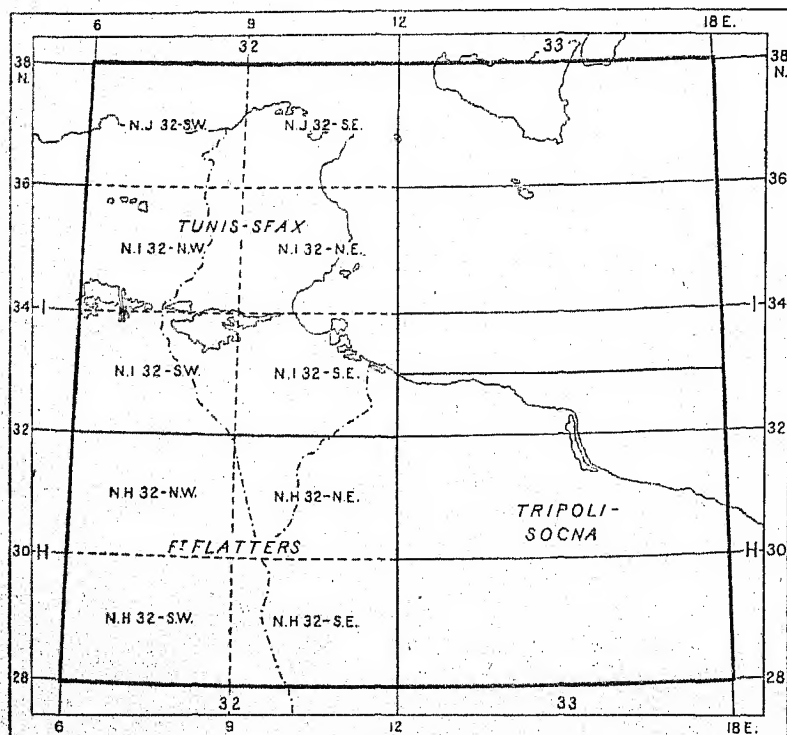
The Tunisian railways present a peculiar mixture of State-owned lines and mineral companies' lines: indeed the development of the system, apart from the State lines joining Tunis and Bizerta to the Algerian system, has rested in large measure on the exploitation of phosphate and iron ore.

The principal normal-gauge lines are those connecting Tunis, Bizerta, and Tabarka with the Algerian system through Souk el Arba and Souk Ahras. A narrow (metre) gauge line leads over the High Tell from Tunis to Tébessa and Constantine, with various short branches. Similar lines lead inland from Sousse and Sfax, primarily to serve the phosphate-producing areas of central Tunisia. The coastal towns are connected by a narrow-gauge line from Tunis to Gabès. The narrow- and normal-gauge lines meet only at Tunis (Fig. 71).

Maps

Nearly all the maps available are of French origin. These are listed in Appendix L, and the maps most generally useful, those on the scales of 1/2,000,000, 1/1,000,000, and 1/500,000, are illustrated in Fig. 3. For finer detail reference should be made to the 1/200,000,

1/100,000, and 1/50,000 series. The location of places mentioned in the handbook is indicated on maps in the text wherever possible.



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The letter N. written before the sheet number indicates that the sheet is north of the Equator

FIG. 3. Index to the 1/500,000, 1/1,000,000, and 1/2,000,000 series

A communications map of Tunisia (1/2,000,000) is included in the pocket at the end of the book.

Spelling of Place-names

Place-names in the text are normally spelt in their French form, except where well-known English forms exist (e.g. Bizerta, not

Bizerte). The maps published show little uniformity: *gh-*, *rh-*, and *r-*, for example, are all renderings of the same Arabic letter, and spellings of the same name may, therefore, vary. In this handbook the spelling *gh-* has usually been followed in conformity with the spelling adopted in the companion volumes on Algeria and Morocco (*Geographical Handbooks*, B.R. 505, 505A, 506, and 506A). Place-names beginning with the words *el* or *la* have generally been printed thus, and not as *El* and *La*. French names have in most cases been adopted for mountains (Djebel, not Jebel), rivers (Oued, not Wadi or Wad), and other features.

A short glossary of Arabic, Berber, French, and other words is given in Appendix K. British equivalents have generally been given in the text for all metric figures, except for tons, which are always metric tons (1 metric ton = 0.984270 ton). Conversion tables are provided in Appendix M.

CHAPTER II

RELIEF, DRAINAGE, AND GEOLOGY

INTRODUCTION

TUNISIA may be conveniently divided into three parts, northern, central, and southern (Fig. 9).

Northern Tunisia is essentially mountainous: its approximate limits are the north coast, the east coast as far as Tunis, the valley of the Oued Medjerda on the south, and the Algerian-Tunisian boundary. The mountain ridges or Tell, part of the Atlas system of Barbary, flank the north coast and are skirted by plains, in which rise isolated hills, from Bizerta to Tunis; they consist for the greater part of sandstones, which are folded, and the surface is forested in the mountains, cultivated in the river valleys and plains.

Central Tunisia, bounded on the west by Algeria and on the east by the sea from Tunis to Gabès, lies between the Medjerda on the north and the Tunisian chotts (low-lying salt lakes and marshes) on the south. Mountains, namely the High Tell, occupy the north-west; they are the prolongation of Algerian chains, as in northern Tunisia, and cross the country in a north-north-east-south-south-west to north-east-south-west direction, fanning out eastward. The mountainous country in the north-west is rugged and confused, and its most obvious boundary is a great chain of summits, broken by valleys and plains, that crosses the whole width of the country: this is the Zeugitane or so-called 'Backbone' ('Dorsale') of Tunisia. South of this marked feature, however, there are numerous other chains and isolated hill groups, but they are separated by extensive plains, the drainage of which is not well marked. The rocks exposed are chiefly limestones and marls, forming harsh and often barren country which contrasts strongly with the wooded mountains of northern Tunisia. Towards the south-east the plains become dominant and form dreary, open, arid country, the steppes. The steppes in turn grade insensibly into the coastal lowlands, or Sahel, with many salt marshes (*sebkhas*); the coastal fringe, where extensive olive plantations have been established, is no more than the cultivable part of the steppes.

Southern Tunisia may be considered to start at a line running approximately westward from Gabès, whence a lowland runs to the great chotts, el Fedjadj, Djerid, and el Rharsa. The ill-defined

margins of the salt marshes and temporary salt lakes are little above sea-level; the Chott Djerid is 52 feet below sea-level. Much water finds its way to the surface and evaporates, giving rise to the salts; fresh water is available, however, in natural springs rising from some depth and in artesian wells. Accordingly, from Gabès to the Algerian frontier near Nefta, there are rich palm-groves in country that is otherwise desert. South of the chotts the country changes. The folds of the Atlas have been left behind, and plateaux and plains, with almost horizontal rocks, supervene. From the chotts to the extreme southern tip of Tunisia, opposite Ghadames, are vast areas of sand-dunes, the eastern part of the Great Eastern Erg of Algeria. East and south of the dunes lie escarpments, the margins of high and arid limestone plateaux. The eastern escarpment is prolonged northward into Tunisia in broken hills in which lie the French coastal defences and the Mareth line, which dominates a low coastal plain. Watercourses, usually dry, descend towards the sea and westward into the sand-encumbered lowland, some of them wandering towards the Chott Djerid. The eastern plateau itself, the Hammada el Homra and Djebel Nefousa, lies in Tripolitania; the Italian coastal defence system lies in Djebel Nefousa and its prolongation towards Tripoli. The southern plateau, or Hammada of Tinghert, runs south-westward from Ghadames, from Italian territory into the Algerian Sahara, and the great sand-dunes of the Zemoul el Akbar, part of the Great Eastern Erg, lie at the foot of its north-facing escarpment. The Tunisian Sahara, desert, is for all practical purposes a dead land.

GEOLOGY AND RELIEF

Geological History (Fig. 4)

THE stratigraphical formations present in Tunisia are listed in Appendix A. Apart from a patch of metamorphic rocks exposed at Djebel el Hairech in the valley of the Medjerda, the oldest visible rocks are of Triassic age, and it is possible, but not certain, that Permian beds may be included among them. They are continental, lagoonal, and shallow water marine deposits, formed during the prolonged denudation of mountains which had been built by (Hercynian) tangential pressure towards the close of Palaeozoic times. The north-west corner of the African shield (Morocco, Algeria, and the north-western part of the Algerian Sahara) was involved in these movements, which evidently died out over the shield towards the south and east. The strike of the Hercynian folds was in large measure

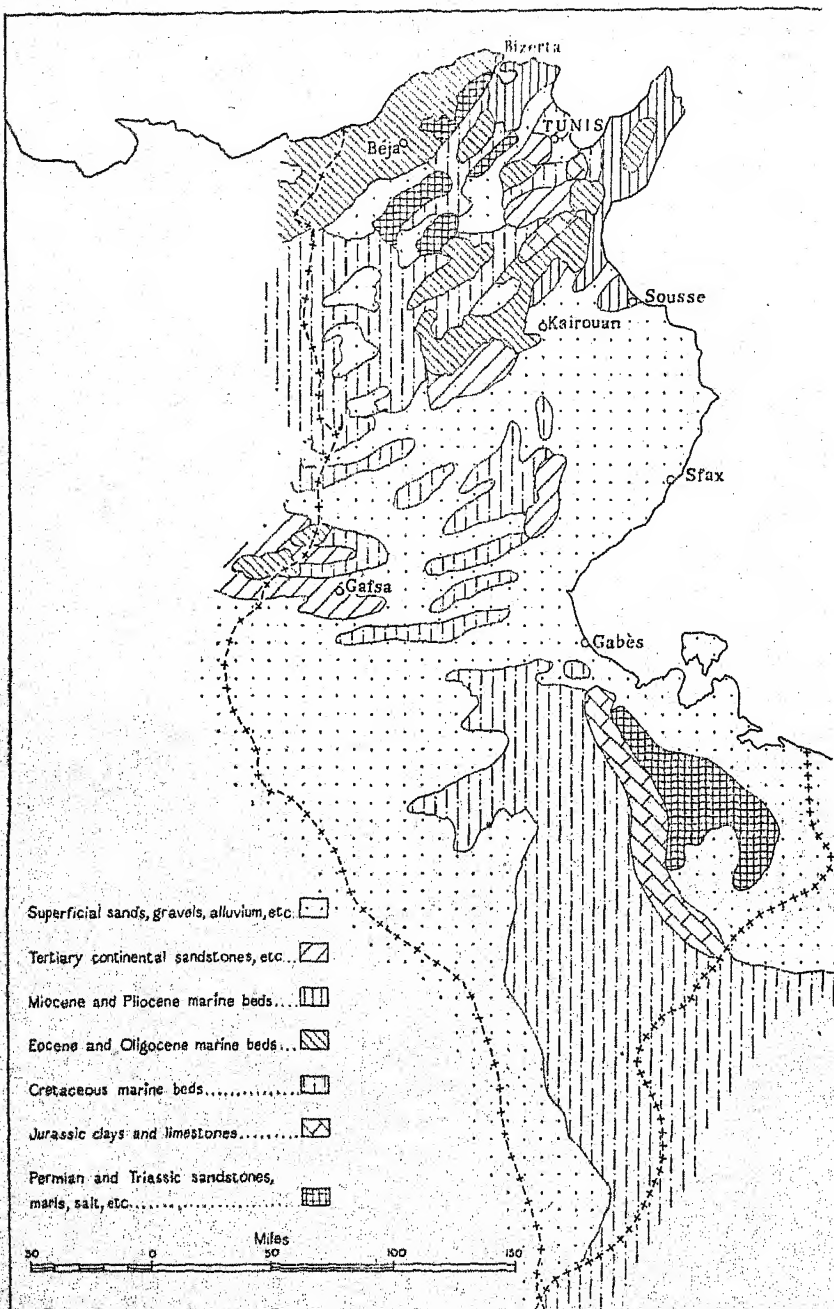


FIG. 4. Geological sketch-map

north-south, a direction which is frequently imparted to undulations and structures of the Mesozoic beds that blanket the shield and conceal the Palaeozoic sediments. The exposures of Trias are generally small and of special character in Tunisia. By Jurassic (Liassic) times a sea had been formed along the northern fringe of the Saharan platform, and great thicknesses of limestone were laid down; they are widely exposed in Morocco and Algeria, and in Tunisia are revealed locally, chiefly in the cores of anticlines. Usually, however, they are concealed beneath Lower Cretaceous marine marls, sandstones, and limestones, the products of the sea, already noted in the Jurassic, which lay east-west along the northern margin of Africa (the Tethys geosynclinal sea).

In Algeria movements of the sea floor are indicated by the distribution of Cretaceous sandstones, marls, and limestones; in Tunisia the last two predominate and may be traced southward with lagoonal deposits over the Saharan platform as the products of a widespread transgression over continental accumulations of dune-sand and pebble beds. The Algeria-Tunisia gulf was encumbered with deposits by the close of the Cretaceous and dawn of the Tertiary, when valuable phosphatic limestones were formed.

Pyrenean (Cretaceous-Eocene) mountain-building movements rough-hewed the Atlas system; in Tunisia, where elevation progressed from south to north, folded structures may be traced south-westward into the Pyrenean Algerian-Tunisian chains and the Saharan Atlas.

Neither in the Eocene nor in any subsequent period did the sea make extensive inroads into the Tunisian or Algerian Sahara, as it had during the Cretaceous. Eocene beds are not seen, in fact, south of the Chott Djerid and the Golfe de Gabès; they are most fully and typically developed in the mountains of central and northern Tunisia, being the dominant exposed rocks in the latter. They are essentially the products of the Tethys and of its northward receding shoreline. Succeeding marine sandstones are referred to the Oligocene. These and Miocene sandstones and marls mark the filling up of the Tethys.

The Miocene witnessed the final period of intense mountain-building within the Tethys geosyncline, although movement was prolonged and probably continued into the Pliocene; earthquakes still occur (Fig. 8). The southern limit of the geosyncline was approximately the line of the Zeugitane mountains. To the north of this, folding was severe, and numerous tightly packed anticlines and synclines were formed; south of them structures are more open

and ill-defined, and show the influence both of the Pyrenean movements and of the proximity of the Saharan platform.

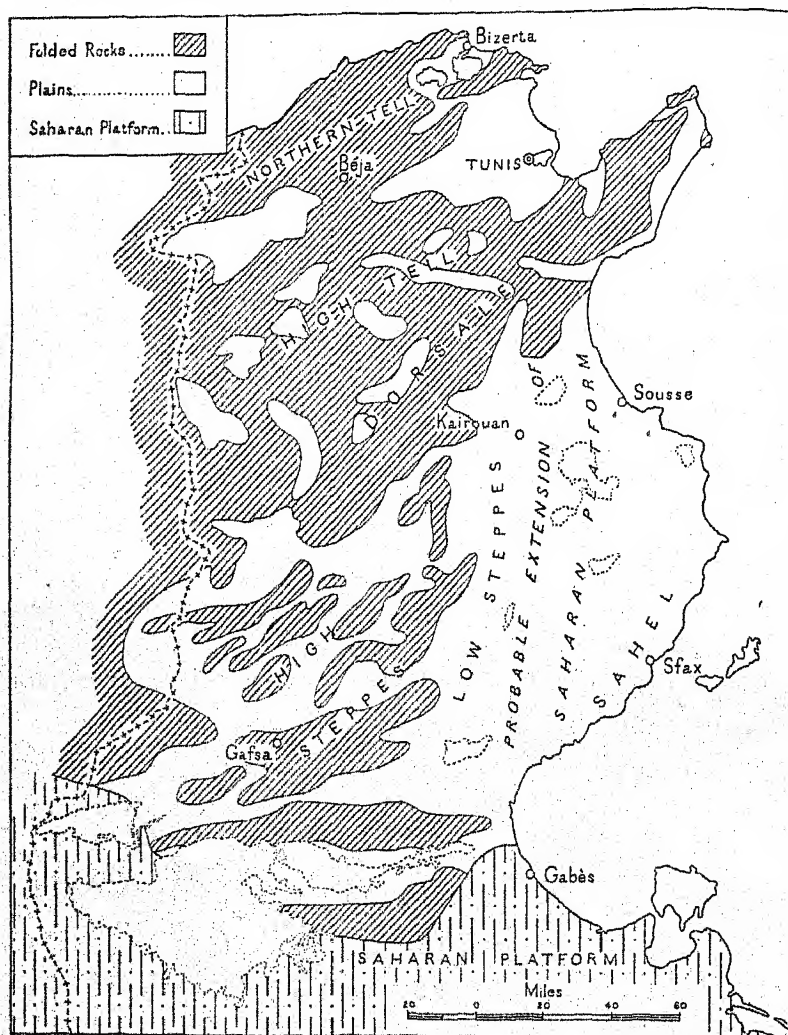


FIG. 5. *Structure*

Upper Miocene and Lower Pliocene continental deposits are difficult to distinguish from one another; classed as Pontian, they include important water-bearing sands, pebble beds, and marls in south-central Tunisia (Gafsa, Tozeur, Nefta, Kebili). Other Pliocene

continental beds, higher in the succession, equally are inseparable from the Quaternary deposits still being formed.

Denudation has been continuous since Miocene times, and intense especially in the northern mountains. In central Tunisia lack of drainage to the sea and accumulation of vast piles of debris in the plains have produced a special type of topography; in the more arid south and in the Tunisian Sahara sand-dunes take the place of much of the water-borne debris, except on the naked plateaux and along the escarpments and mountain sides, where torrents occasionally flow.

Structure and Relief (Figs. 1, 5-7)

Throughout Tunisia structure and relief are related in a striking manner. The structure is simple in broad outline. In the Tell it consists of a considerable number of straight, narrow, often crowded, mountain-forming anticlines (or elongated domes) and synclines; they are often broken by faulting and lowering of the axes. Depressions are occupied by younger beds than those exposed by denudation in the mountains, and there are accumulations of alluvial and other superficial deposits. The folds are aligned north-north-east-south-south-west to north-east-south-west (Fig. 7).

Towards the south the high mountains of narrow folds give place to widely spaced domes, separated by plains of superficial deposits which hide the 'solid' geology. Alinement swings from north-east-south-west towards east-west. Moreover, the domes are replaced eastward by a monotonous steppe.

Structures of the same type may be traced southward to the great Tunisian chotts, which lie in deep depressions between high east-west domes. The line of the chotts may be regarded as the junction of the folded structures of Barbary (Atlas) on the north and the platform structures of the Sahara on the south, but there is a northern extension of the platform in eastern Tunisia (p. 23). Southernmost Tunisia is a desert of sand-dune plains, plateaux, and escarpments, structurally uniform, affected by some undulations. The folded rocks consist principally of sandstones, limestones, and marls: the oldest rock widely represented is the Trias, which is in a normal stratigraphical position in the region of the Libyan frontier, but within the mountains of northern and central Tunisia may be 'intrusive'. It is salt-bearing and has risen through the overlying sediments as a result of mountain-building movements: it occurs in small outcrops here and there, simulating the behaviour of igneous intrusion. The Trias has continued to adjust itself after the main mountain-building movements

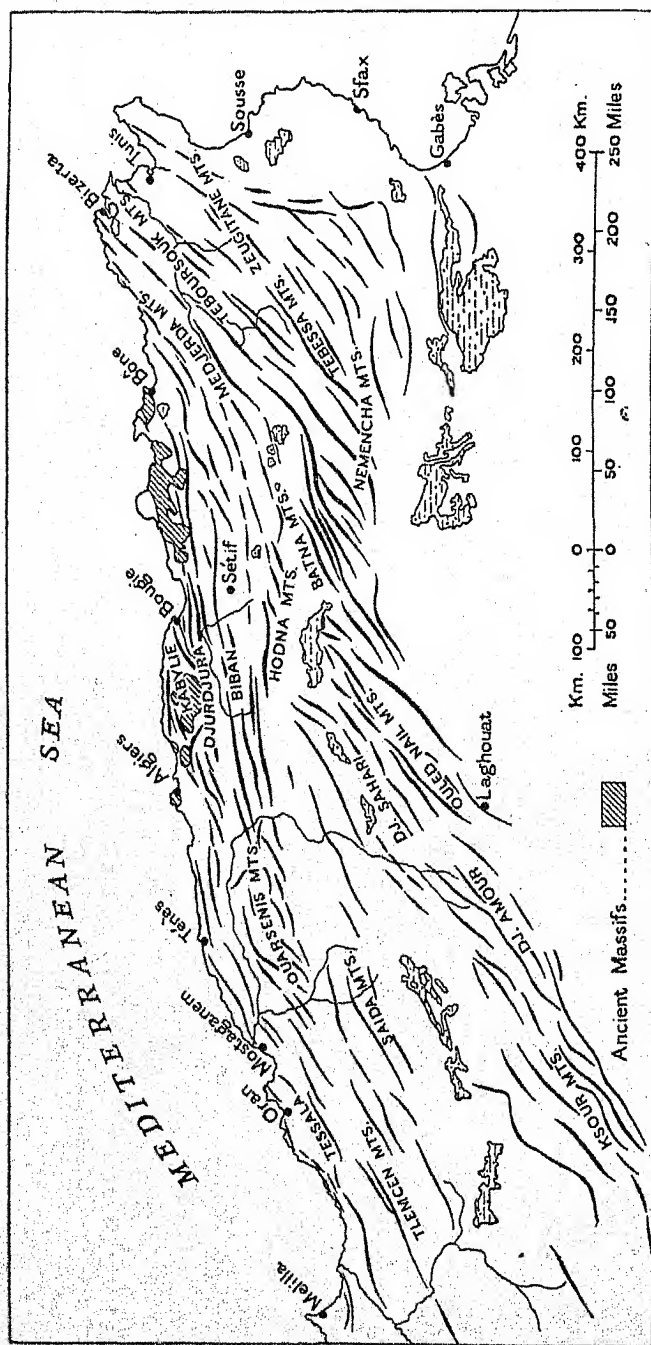


FIG. 7. The trend lines of folds in Algeria and Tunisia

north-north-east-south-south-west or north-east-south-west, they consist largely of anticlines and synclines elongated or succeeding one another in that direction, crossed by faults or undulations almost at right angles to it: there results, therefore, a succession of domes and basins, truncated structures, and mountain masses in which several anticlines and synclines are united in complex groups. They consist of Lower and Middle Eocene and Cretaceous rocks in which dominant limestones and sandstones form conspicuous ridges and mountain flanks, and are most prominent in the country of le Kef, Teboursouk, Maktar, and Thala. They are prolonged north-eastward across the Medjerda in the Monts de Teboursouk.

In the neighbourhood of Thala the Algerian-Tunisian chains are continued north-eastward in the Monts de Tébessa, with much the same structure as that noted above but diverging a little from the chains on their northern side; that is, they run more truly north-east-south-west, instead of inclining towards north-north-east-south-south-west. Among these mountains, moreover, and on their flanks, plains become larger and more frequent than they are in the north. The Monts de Tébessa are continued in the Zeugitane chain of domes, in which Jurassic beds are exposed among Lower and Upper Cretaceous rocks, flanked on the north by the lower country and chains of the Oueds Siliana and Miliane, and on the south by wide lowlands. The Monts de Tébessa and the Zeugitane chain thus form the most prominent physical feature in Tunisia, a prominence which is exaggerated by the flanking lowlands; hence the term Dorsale, or Backbone, which is in common use to describe especially the Zeugitane chain, culminating in Djebel Zaghouan.

South of the Monts de Tébessa-Zeugitane chain the structure changes appreciably. Three facts are noteworthy. First, the domes become widely separated and are little more than isolated mountains and uplands among extensive plains. Secondly, their alinement swings from north-east-south-west to east-west, a feature which is prominently displayed in Djebels Cherb and Tebaga on the north and south sides respectively of the Chott el Fedjadj. Thirdly, the eastern parts of the chains turn sharply to strike north-south: this change of direction takes place along a line from el Hamma (Gabès) to the base of the Cap Bon peninsula where north-south strikes meet the north-east-south-west folds of the Dorsale. It is considered that the low steppes of Tunisia east of this line between the Golfe de Hammamet and the Golfe de Gabès should be regarded as a part of the Saharan platform, that the fold-structures of the Atlas come to an

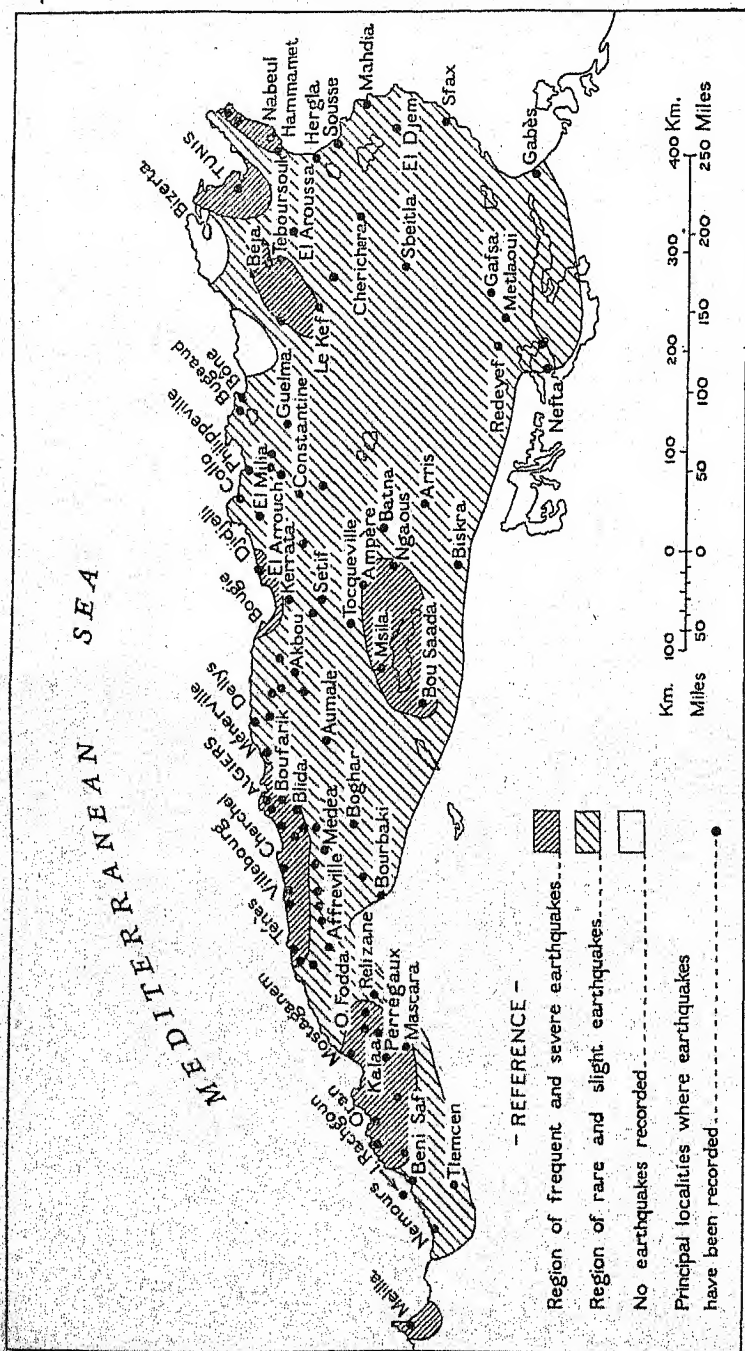
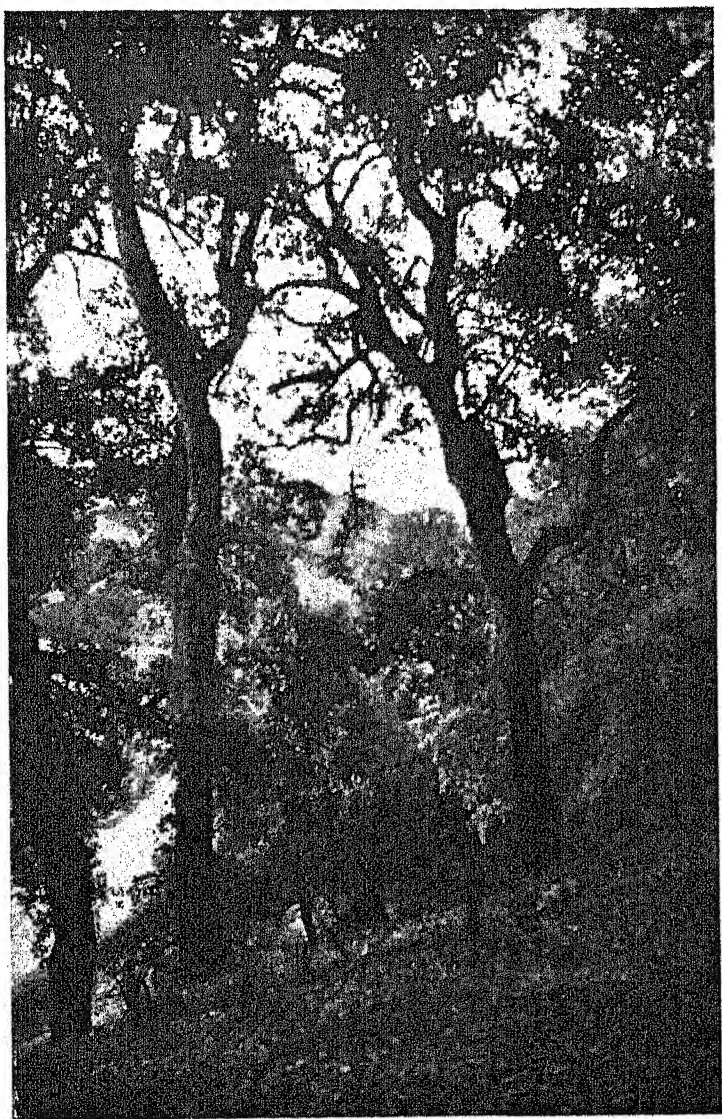


FIG. 8. The distribution of earthquakes in Algeria and Tunisia



2. Cork-oak forest in the Kroumirie near Ain Draham



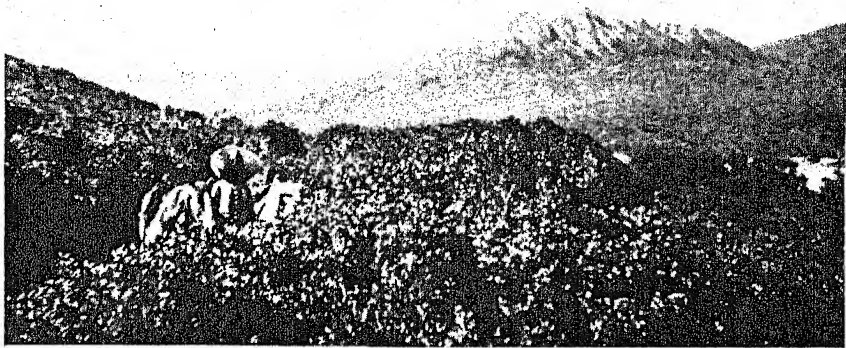
3. *Valley of the Oued Gria, Amdoun district*



4. *Plain of the Oued Zouara in the Nefzas*

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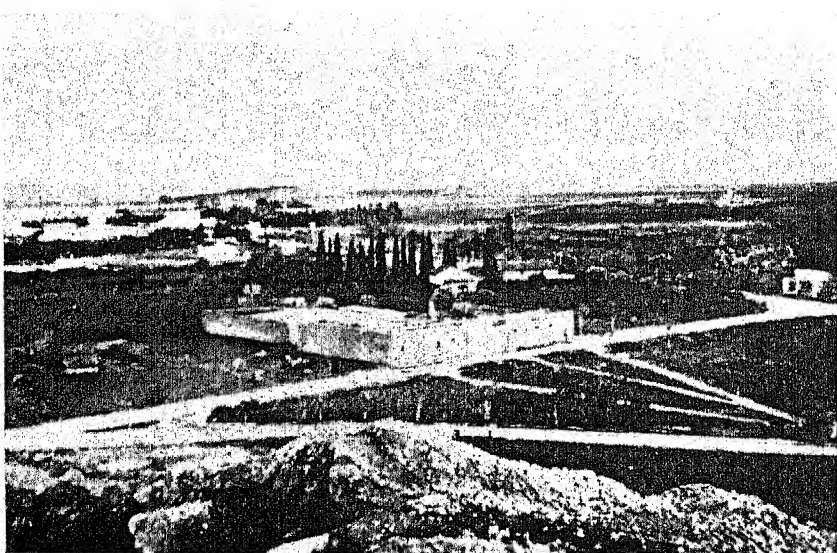
5. *Brushwood on sandstones, the Mogods*



6. *High brushwood, the northern Tell*



7. *Country north of Béja*



8. *Plain of Mateur: view south from near Mateur station*

end here, and that the alinement of the chains is related to the presence of the platform.

(c) *Southern Tunisia*. Generally the beds dip very gently westward so that the Triassic rocks near the Libyan boundary pass to the west under Jurassic and Cretaceous beds which form the escarpment and outliers south of Médenine. The Cretaceous beds in turn lose height westward, owing to the prevailing dip, until they pass under sand-dunes: they may be traced southward to the southern limit of Tunisia where their outcrop runs approximately east-west, forming the Hammada of Tinghert (*Geographical Handbook of Algeria*, B.R. 505, p. 74). Around Gabès, however, the Mesozoic rocks are arched to form a gentle anticline, and northward dips are seen in Djebel Saikra. Moreover, near el Hamma, at the eastern end of the Chott el Fedjadj, north-striking folds appear and may be traced at intervals northward as described above.

West of el Hamma the Chott el Fedjadj has been eroded in the centre of a great east-west anticline, in the core of which Cretaceous rocks appear; it is maintained by some geologists that the core of the anticline has foundered and that its site is marked by the chott. The depression of the Chott Djerid, west of the Chott el Fedjadj, is occupied by continental deposits, those exposed being of Recent age.

Running Water

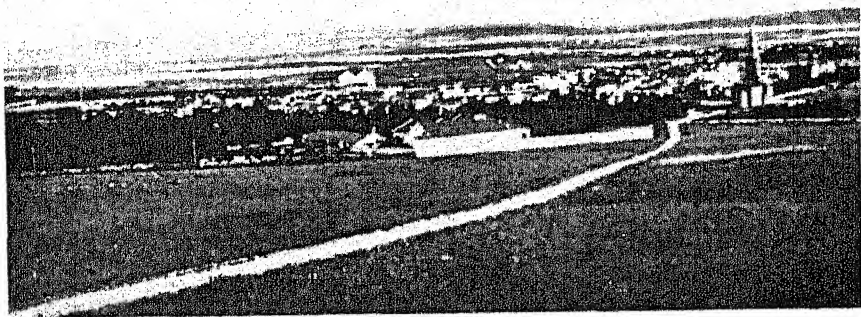
Three types of surface drainage occur in Tunisia: (a) Mediterranean oueds, that is, rivers which flow from the mountains to the sea; (b) closed basins, into which the run-off from high ground flows but does not pass on to the sea; (c) Saharan watercourses, usually dry, occasionally flushed, carrying water to desert lowlands where it is absorbed or evaporated, some of them debouching on to the southern coastal plain.

(a) *Mediterranean oueds* are intimately related to the fold-systems described above, both in direction and profile. Their profiles show that, even in the northern Tell, almost all the drainage was of the closed basin type (that is, interior basins cut off from the Mediterranean, each developed according to the local conditions) and that one by one they were tapped by systems that already drained to the sea. The profiles, therefore, consist of distinct sections having gentle slopes joined by steep intermediate sections. The lakes of the Bizerta region are basins which have been drowned by the sea.

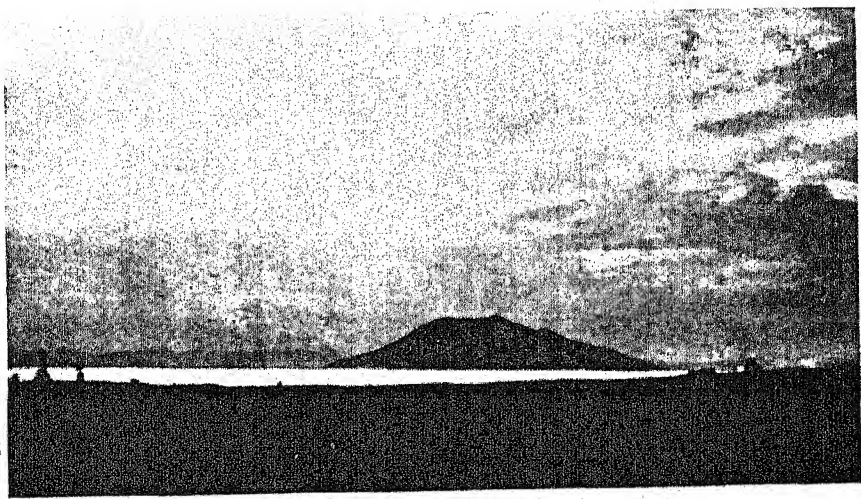
Surface drainage which reaches the sea is almost entirely limited to the country between the north coast and the Dorsale, discharging into the Golfe de Tunis for the most part by the Oued Medjerda, the principal river of Tunisia. The Medjerda rises in eastern Algeria, in the high plains between Sédrata and Souk Ahras; it enters Tunisia near Ghardimaou, having fallen several hundred feet in its steep valley east of Souk Ahras. Its course lies in a lowland valley between the Monts de la Medjerda (Kroumirie) on the north and the High Tell on the south. It receives tributaries from both mountain groups; among these is the Oued Mellègue, which, joining the Medjerda on the south side near Souk el Arba and having its headwaters in the eastern high plains of Algeria east of Ain Beida, also drains part of the High Tell and of the Monts de Tébéssa. The Medjerda cuts through the Monts de Teboursouk between Oued Zarga and Medjez el Bab: between these two places it receives on the south the Oued Siliana, which with its tributaries drains much of the eastern part of the High Tell and the northern flanks of the Dorsale. Medjez el Bab is the gateway to the plain of Tunis, across which the river meanders to the sea.

The mountains north and west of the plain of Tunis are drained by several rivers which discharge into the basins around Mateur and Bizerta. The northern flanks of the Mogods and the Kroumirie drain directly to the sea. The southern part of the plain of Tunis receives the run-off of the eastern part of the Dorsale, including Djebel Zaghuan, by the Oued Miliane. The Cap Bon peninsula drains directly to the sea by short, fairly straight streams flowing directly from the watershed: there is a prominent lowland, which contains no large river, at the base of the Cap Bon peninsula by which road and rail pass southward from Tunis through Grombalia to Enfidaville and the south.

(b) *Closed basins* are widespread in Tunisia, and, as already pointed out, they were formerly the normal drainage of northern Tunisia. South of the Dorsale they are still the only form of drainage, excepting short streams which flow towards the coast and discharge into lagoons. The basins owe their origin to the disposition of the mountains, to the slight elevation and lack of dominant seaward slope in the wide plains between the mountains, to the nature and arrangement of the rocks, which favours absorption, evaporation, and stagnation, and to the low rainfall. Run-off may have been more rapid in late geological times, but it served only to encumber the lowlands between the isolated mountains with debris which formed



9. *Ferryville*



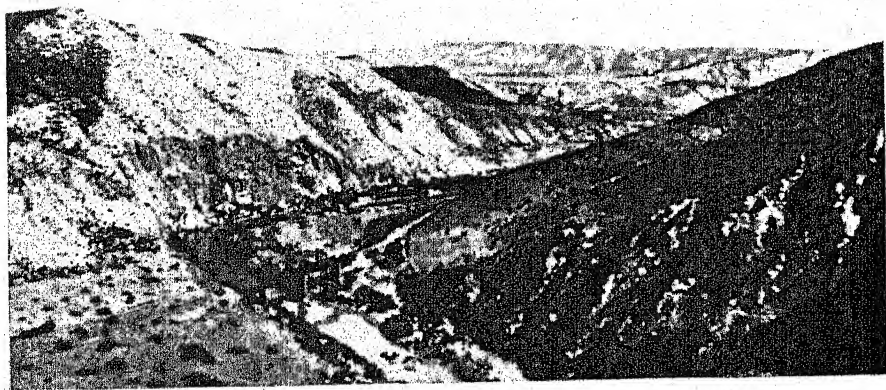
10. *Djebel Achkel and the Garaet Achkel*



11. Bizerta from the north-west: to right of town the Goulet du Lac and the Lac de Bizerte; to the left the Baie de Bizerte



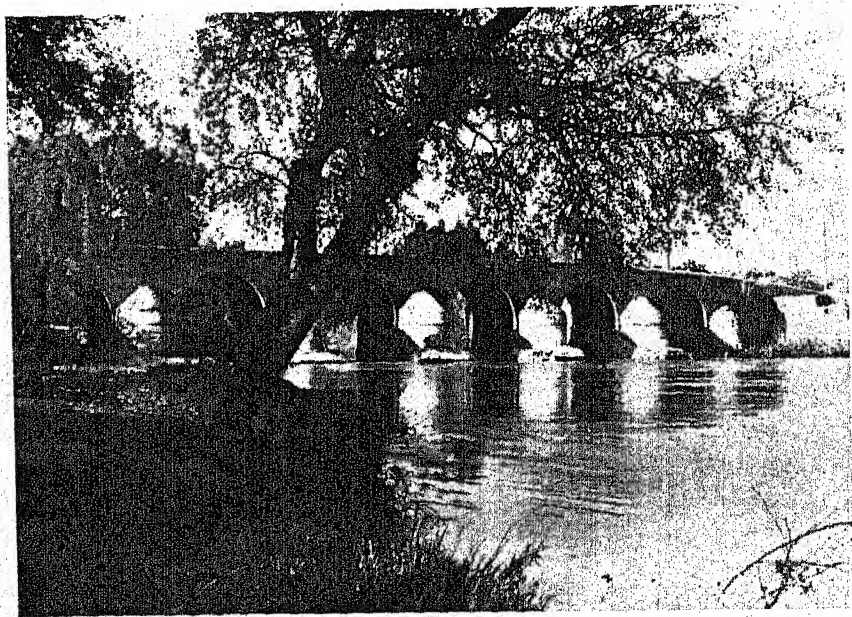
12. *Northern margin of the Rekba plain: Kroumirie foothills
in background; jujube brushwood in foreground*



13. *Valley of the Oued Medjerda near confluence with the Oued Béja:
Sidi Chemmar railway bridge in foreground*



14. *The Oued Medjerda in flood at Tebourba*



15. *Bridge over the Oued Medjerda at Djedeida*

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thickening piles of deposits, thereby adding to the degree of stagnation, absorption, and evaporation. No river had sufficient volume, velocity, and gradient to cut a path for itself to the sea. Central Tunisia, therefore, is a land of far-flung stream beds uniting into considerable watercourses which either fade out in plains of rock debris or discharge into sebkhas; the sebkhas are often dry and saline, sometimes salt marsh, and, in wet weather, impassable muddy swamps and ephemeral lakes. Some of the sebkhas are permanent salt lakes with encircling salt marsh; the largest of them lie on a north-south line a little west of the Sousse-Sfax road. In the vicinity of the Monts de Tébesa and the mountains of the Algerian-Tunisian chains north of the latitude of Gafsa the stream courses lie between uplands and mountain masses, and provide passes for communication (as in the vicinity of Kasserine). Small towns and villages are sited upon them, and roads and tracks, wandering over the open plains, join or intersect usually at these small centres of population (for example, Sbiba, Sbeitla, Fériana, and Gafsa).

South of the latitude of Gafsa lie the east-west mountains (p. 42) and the great chotts that lie in a tectonic lowland stretching along the foot of the entire length of the Saharan Atlas and the Aurès (in Algeria), thence eastward and below sea-level through the Chott Melghir (Algeria) into the southern Tunisian chotts of el Rharsa and Djerid, to the Chott el Fedjadj. A slight step or sill lies between the eastern end of the Chott el Fedjadj and the sea near Gabès. Towards the vast area of lowland, stream courses descend southward from the mountains on the northern side, but many of them fade out in the arid plains.

(c) *Saharan watercourses* are of the usual type seen in deserts where hills and escarpments, receiving occasional rainfall, stand above sandy lowlands. The western side of the Hammada el Homra is trenched by comparatively short, steep, dry oueds; where the plateau is continued northward in a spur, broken into outliers which constitute the flat-topped or irregular mountains around Fom Tatahouine and Djebel Matmata, oueds descend on both west and east sides. On the west they end in narrow basins or, south of the Chott Djerid, in sand-dunes; on the east a few have ephemeral courses to the sea, and the remainder fade out or end in sebkhas.

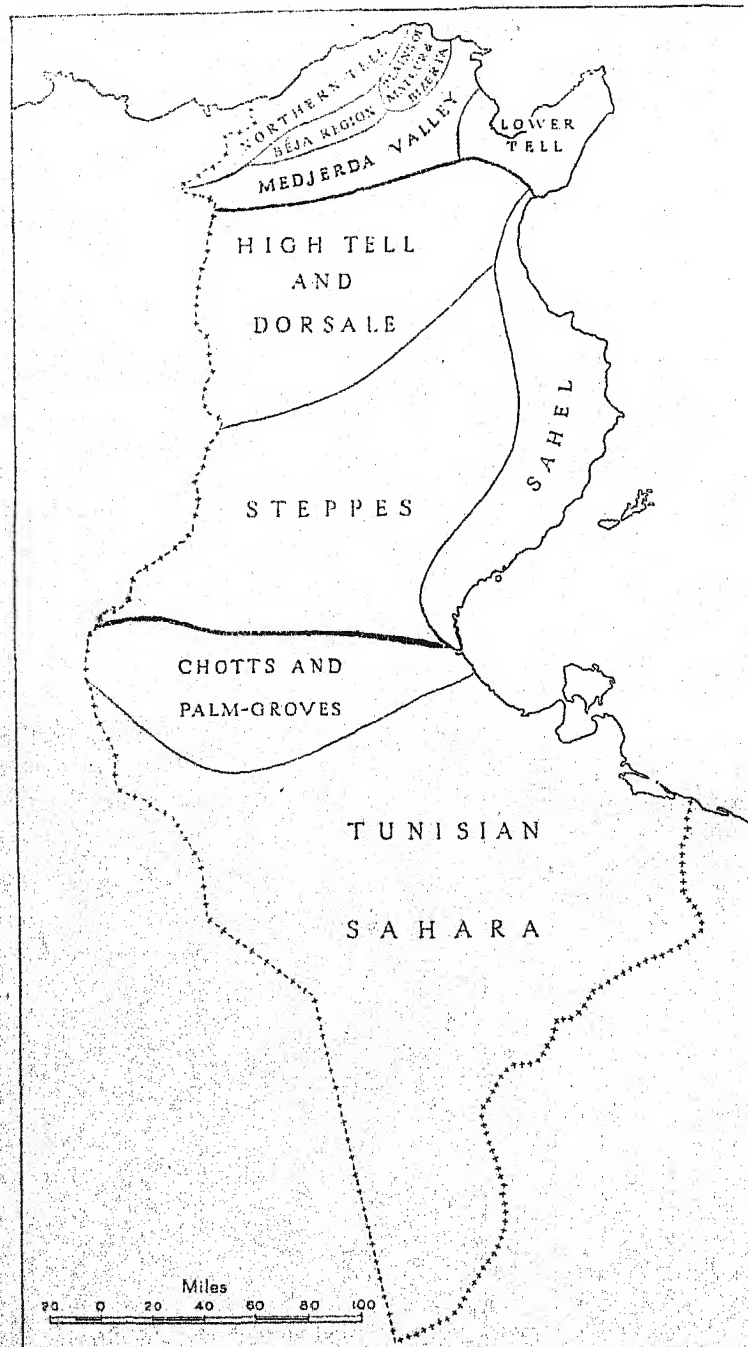


FIG. 9. *The physical regions of northern, central, and southern Tunisia*

CHARACTER OF THE COUNTRY

THE major and subsidiary divisions of Tunisia, shown in Fig. 9, are as follows:

Northern Tunisia

- The Northern Tell: the Kroumirie and Mogods.
- The Béja Region.
- The Plains of Mateur and Bizerta.
- The Medjerda Valley.
- The Lower Tell and Tunis.

Central Tunisia

- The High Tell and Dorsale.
- The Steppes.
- The Sahel.

Southern Tunisia

- The Chotts and Palm-groves.
- The Tunisian Sahara.

NORTHERN TUNISIA

(Fig. 10)

Northern Tunisia extends from the Algerian frontier to the Golfe de Tunis, between the Mediterranean and the Medjerda valley. It is the richest and most varied part of the country. In the west it is well watered and wooded; outside the woodlands and forests agriculture takes precedence over stock-raising because harvests are assured and regular; its population is, therefore, mainly sedentary. One of the dominant characteristics of the northern Tell is the passage from steep to gentle slopes without transitional stages, mountains thus rising very sharply from extensive plains or enclosed depressions.

Almost the whole of the northern Tell was long occupied by interior basins which, with the exception of the Bizerta basin, were cut off from the sea and developed separately until one by one they were tapped by drainage systems reaching the sea. The courses of the rivers, therefore, have distinct sections, gentle slopes being joined by steep intermediate courses. This feature is especially clear in the valley of the Medjerda.

The Northern Tell: the Kroumirie and Mogods

The sandstone Monts de la Medjerda continue the mountains of north-eastern Algeria. They lie between the north coast and the

Medjerda valley, ending in heights overlooking the plains of Bizerta and Mateur. The rivers have denuded and broken through the arches of the folds to reveal in their valleys the underlying limestones and marls. The Kroumirie folds reach the coast, and stand at right angles to it, near Tabarka. Erosion of the sandstones has led to the growth of sand-dunes, succeeded between Cap N  gro and Cap Serrat by wild and rugged rocky cliffs.

The   le de la Galite, 25 miles north-west of Cap Serrat, is made of volcanic rocks; it is separated from the mainland by a channel which is barely 650 feet deep.

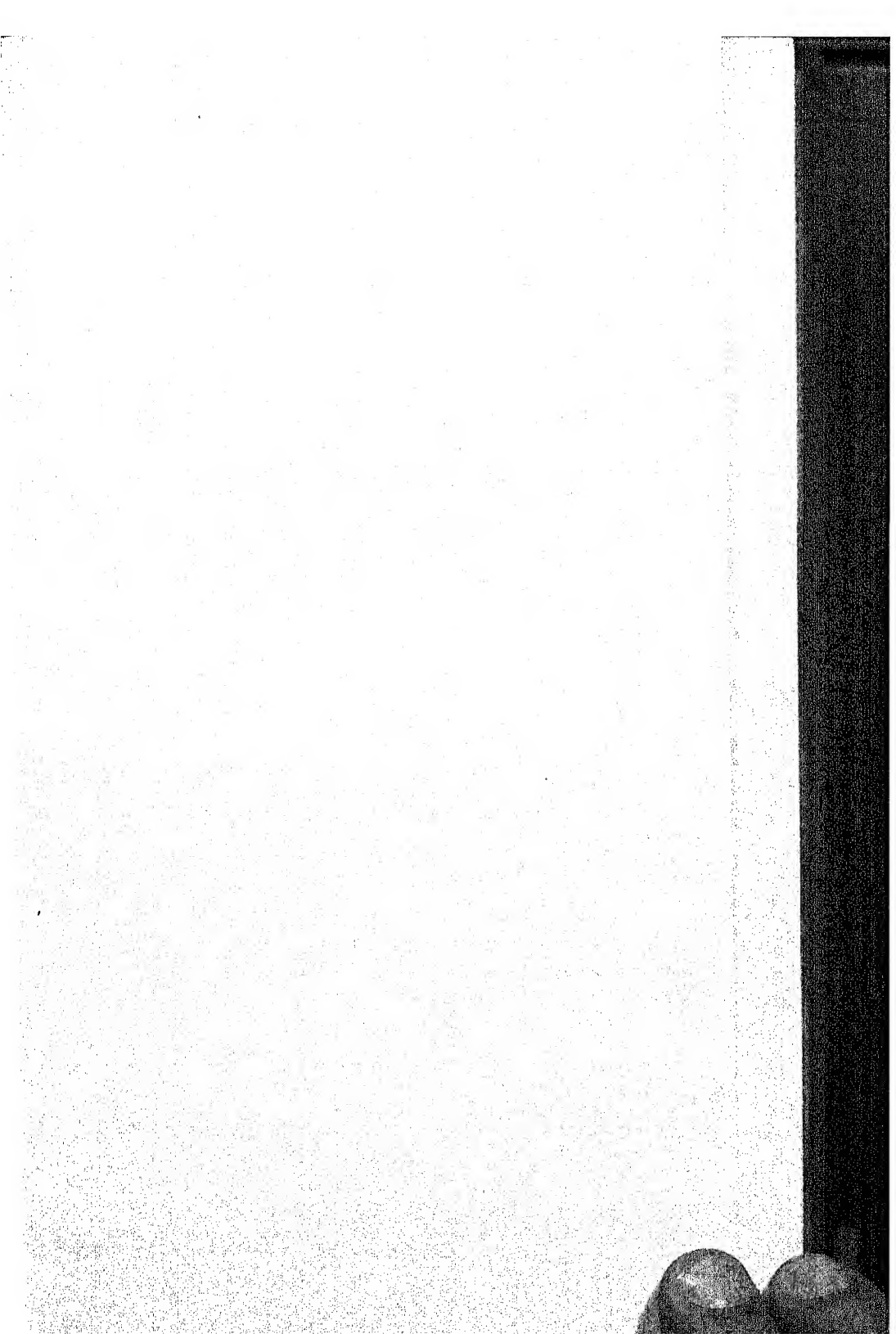
With the Kabylie des Babors in Algeria, the Kroumirie receives the highest rainfall in north Africa, with 40 inches at Tabarka and more than 60 inches at Ain Draham. Latitude, altitude, proximity to the sea, and the dominant sandstones all combine to make the district essentially one of forests; the sparse population and paucity of flocks and herds have kept down deforestation. The coastal forest belt is thus continued without interruption eastward from the Kabylie of Algeria. Cork oak and Portuguese (zen) oak predominate, with ash and elm in cool and damp places, besides olive and, near the coast, pine (Photos. 2, 73, 76). In the Kroumirie forests chestnut, holly, ivy, and numerous ferns occur, probably introduced from Europe. The oaks disappear where the underlying calcareous beds are exposed.

With its high forests of old trees, luxuriant undergrowth, and damp ravines, the Kroumirie is like a corner of Europe in Africa; the Mogods, on the other hand, are covered mainly with brushwood (Photos. 5, 6). Between the two areas lies the Nefzas basin, containing marls and alluvial deposits, along the edge of which run the road and railway from Tabarka to Mateur (Photo. 4).

The B  ja Region

The B  ja region consists of the south-eastern flanks of the northern Tell, from Fernana to the H  dil country on the north side of the Medjerda. It provides a strong contrast to the forest and brushwood-clad highlands of the north; the country is open, with wide views, and fields of grain replace the forests. Limestones predominate, forming white stony and rocky plateaux (*sfaiet*), tablelands (*dir*), and cliffs (*kef*); exposures of marls give rise to broad depressions (Photo. 3).

Along the edge of the forests the country is much broken up: the highlands are dry, and cultivation is limited to the plains: the Fernana, Amdoun, and H  dil districts are of this type. The Bled B  ja, where Tertiary and Quaternary beds are exposed, is much more fertile, and



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is possibly the best farming land in the whole of Tunisia; it has long been cultivated and is dotted with Roman and other ruins. Much wheat is grown here. Béja stands at important crossroads, at the meeting of broad valleys leading south to the Medjerda and north-east to Mateur and Bizerta (Photo. 7).

The valleys of the Oueds Tine and Djoumine mark the prolongation of the plain of Béja, and join it to the plain of Mateur. A continuous chain of mountains from 1,600 to 2,000 feet in height, called the chain of the lower Medjerda, runs between the Oueds Tine and Medjerda. Several Berber villages have survived, for example those of Chaouach and Toukabour. There has been extensive European colonization in the Béja region.

The Plains of Mateur and Bizerta

This region is one of transition from the northern Tell (to which it belongs in its essential character and climate) and the eastern or Lower Tell, of which in many respects it forms a part. It is a low-lying country, much of it elevated above the sea in geologically recent times. From the plain of Mateur rise the two isolated mountains of Djebels Achkel and Kechabta, on the northern side of which lie two lakes, the Garaet Achkel and the Lac de Bizerte, joined by the Oued Tindja (Photos. 8, 10). These lakes are an internal drainage basin, flooded by the sea; because the Garaet Achkel is a depositional basin the Lac de Bizerte is not filled up with alluvium. During the six rainy months of the year the Garaet Achkel is filled with water which has run off the land; during the rest of the year it is filled by the sea. The plain of Mateur is being rapidly increased, at the expense of the Garaet Achkel, by the spreading out of alluvial deposits brought by the Oueds Djoumine and Tine.

The plains provide rich agricultural land, which has been extensively colonized by the French. Bizerta has been made into a great naval base and commercial base, whence a deep-water channel dredged across the Lac de Bizerte leads to the arsenal of Ferryville (Photos. 9, 11, 139). The populations of both towns are largely French. Mateur is the centre of railways from Bizerta to Tabarka, Béja and thence to Algeria, and Tunis, and roads from these places meet there: direct roads also lead from Tunis to Bizerta and Ferryville.

The Medjerda Valley

The Medjerda valley forms a broad lowland on the southern side of the northern Tell. Its headwaters drain a large part of the high plains

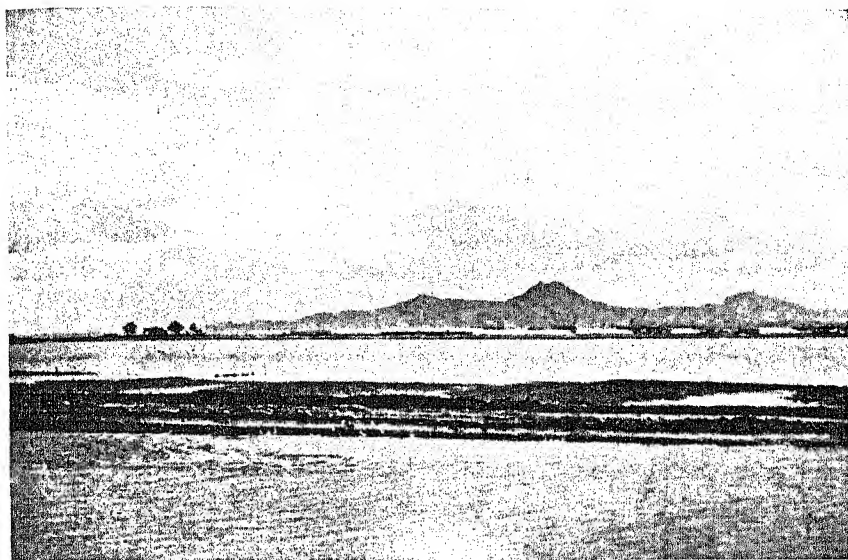
of Constantine in eastern Algeria, and from Souk Ahras to Ghardimaou the river flows in a deep and wild gorge, in which runs the railway joining Algeria and Tunisia. Its valley broadens sharply at Ghardimaou and the river flows in alluvial plains, where its vertical banks rise 30 to 40 feet and its course meanders.

The plains are in fact old lake basins filled up by the river and its tributaries. Each part has its own name; to the west is the Rekba or plain of Ghardimaou, in the centre is the broad plain of Souk el Arba, the Dakhla, and south of Souk el Khemis is the Merja (Photo. 12). In the Dakhla the ancient courses of the Medjerda, at higher levels than the present, are easily discernible: in its central part the plain has been built up by river alluvium, and marshes have formed along its banks. The Medjerda is joined between Souk el Arba and Souk el Khemis by its tributary the Oued Mellègue, which also comes from the high plains of Constantine. The flat, open, low-lying plains of the middle Medjerda provide good agricultural land. European property comprises some 60,000 acres, of which about 42,000 acres are around Souk el Khemis. The deep soils of the wide plains lend themselves to methods of farming (including mechanization) which produce remarkable yields of cereal crops. Ruins of Roman and other civilizations abound, bearing witness of the peoples that have arisen in these plains and of the tides of invasion that have swept over them.

Towards the east the plains narrow, and from Oued Zarga the river passes southward in a gorge to Testour, where it turns north-eastward again and flows in the lowland valley of Tebourba to Djedeida (Photos. 13-15). The change of direction and slope corresponds with the geologically recent tapping and draining of the Dakhla lake by the lower Medjerda. Near Testour the Medjerda is joined by the Oued Siliana, which drains part of the Dorsale.

From Ghardimaou to the sea the Medjerda falls only 650 feet in 300 miles, its slopes being gentle but irregular. Erosion of the river bed is still considerable, and the hydrographic basin is evolving rapidly. The variation in flow of the Medjerda at Tebourba is remarkable: for example, 34,000 cubic feet per second during the rainy season, 460,000 cubic feet or more in flood, and only 35 cubic feet in the dry season (Photo. 14). Floods are dangerous: on a small scale they cover the lowlands near the river mouth, but major floods overflow the river banks downstream of Tebourba and submerge the whole plain.

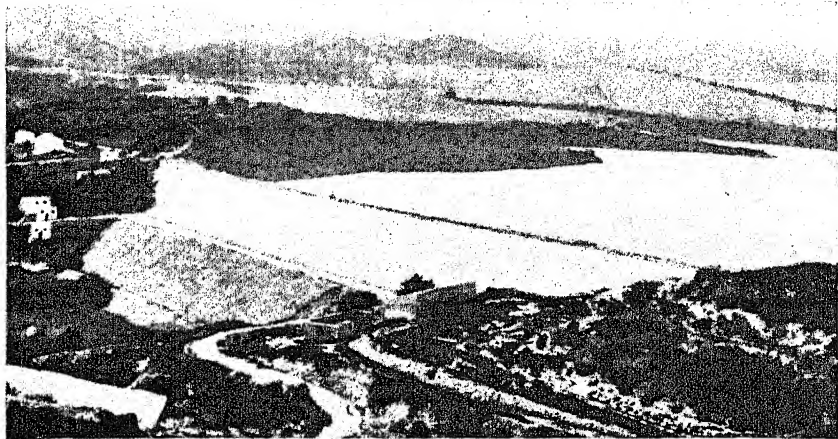
The Medjerda is the only river of Barbary with a delta, which begins at Djedeida and has an area of some 275 square miles. The



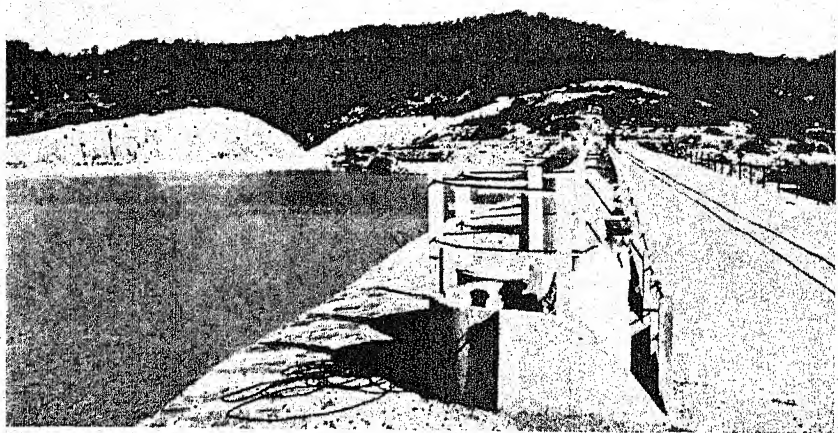
16. *Lac de Tunis: Djebel bou Kournine in background*



17. *Tunis*



18. *Barrage and reservoir on the Oued el Kebir at Sidi bou Beker*



19. *Barrage on the Oued el Kebir*

river has filled up an old gulf, aided by the headland of Ras Sidi Ali el Mekki (Cap Farina, Ras et Tarf), which deflects the sea currents and prevents them from scouring the alluvium carried by the river. Three former islands—Chaouat, Mabtouha, and Galaat el Andeless—have played a prominent part in the formation of the delta, in which the rate of accumulation has been very rapid. The sea originally reached as far as Djedeida; then the three islands were joined to the mainland. In the eighth century B.C. the coast ran from Ras Sidi Ali el Mekki through Utique, Galaat el Andeless, and Sidi Amor bou Ktioua to Cap Kamart, and the Golfe d'Utique consisted of three bays. In the fourth century A.D. the Medjerda reached the sea in the Gueraa bou Ammar, and Utique was still beside the sea, but was abandoned in the seventh century. The present position of the mouth of the Medjerda is 12 miles from its position in Carthaginian times, and about 116 square miles have been won from the sea. A line of dunes gives the coast its present shape from the mouth of the Medjerda to Cap Kamart. The dunes which are steadily raised by winds, and are now from 10 to 45 feet high, rise towards Cap Kamart.

The lower plains of the Medjerda are both fertile and unhealthy, damp in the wet season, dry and scorching in summer. Malarial mosquitoes breed in the sheets of water. Mortality from malaria may be high; for example in 1900 one-third of the population of the village of Aousdja died. Ancient townships and modern farms alike have been sited to escape floods and they may be found either on the banks of the river, which stand above the plains, or on the junction of the plains with the surrounding country.

The Lower Tell and Tunis

The Lower Tell falls into three parts: the regions of Medjez el Bab south of the Medjerda, of Tunis, and of Cap Bon. The highland that runs north-eastward from the High Tell forming the 'Dorsale' (p. 23), although apparently prolonged in Cap Bon, in fact ends at the Golfe de Tunis in Djebels Ressas (2,608 ft.) and bou Kournine (1,870 ft.), which dominate the surrounding lowlands and small hills (Photos. 16, 61). Lowlands lead southward to the steppe, and the northern Tell forms a screen, so that the climate is distinctive. Vineyards are characteristic of the region, replacing cereals and olives as the dominant crop.

The country is drained by the Oued Siliana, a tributary of the Medjerda, and by the Oued Miliane. The Miliane, occupying a basin filled with alluvial deposits, spreads out in the plain of Mornag

before reaching the Golfe de Tunis. A series of plains between the Oueds Siliana and Miliane—el Aroussa, Bou Arada, Pont du Fahs—assures easy communications south-west of Djebel Zaghouan between the interior and the Sahel of Sousse (through Enfidaville); another plain stretches across the northern end of the Zaghouan between Depienne (Smindja) and Bou Fichta, also giving access thereby to the east coast.

North-west of Pont du Fahs lie the small Sebkret el Kourzia and, north of Djebel Rihane, the enclosed Goubellat basin: these two features show that the drainage of the country is still incomplete.

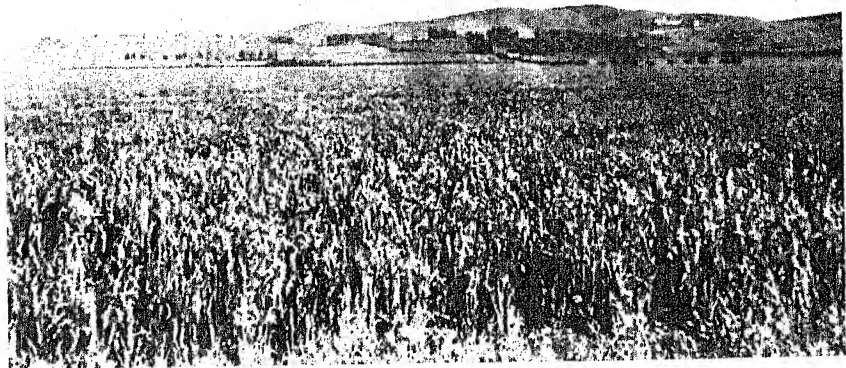
The Golfe de Tunis is a region of depression and submergence, much encumbered by the deposits carried into it by the Oueds Medjerda and Miliane, and by streams from isolated hills. The site of Carthage was formerly an island, little by little grafted on to the mainland by deposition of silt and sand (Photos. 61-63): in the process the Sebkret er Riana and the Lac de Tunis were cut off from the sea.

East of Tunis the peninsula of Cap Bon, called the Djezira (island) by the Arabs, comprises a sandy area of geologically recent construction, with a central ridge rising to 2,090 feet in Djebel Sidi Abd er Rahman. It is joined to the mainland by the alluvial plain of Grombalia.

Communication between the plains of the Lower Tell is easy; there are no continuous barriers. Gentle slopes dotted with hillocks are covered with low scrub of rosemary, diss, and sparte grass. The low altitude and open country, which are characteristic of the region, give access to winds from the south. Rainfall is slight (about 16 inches a year), varying widely from year to year, evaporation is high, and the range of temperature severe: the sirocco has full play. The presence of the sea exerts little influence on the climate, which is strongly continental, except along a narrow coastal belt and particularly at the end of Cap Bon.

As the climate is really that of a steppe, water-supply is a vital problem. To supply Tunis and its suburbs it has been necessary to tap springs of Djebel Zaghouan, Ain Djougar, and Djebel Bargou, to build a barrage and reservoir on the Oued el Kebir (the upper course of the Miliane), and to sink wells in the valley of the Oued el Kebir and on the slopes of Djebel Ressas (p. 255; Photos. 18, 19).

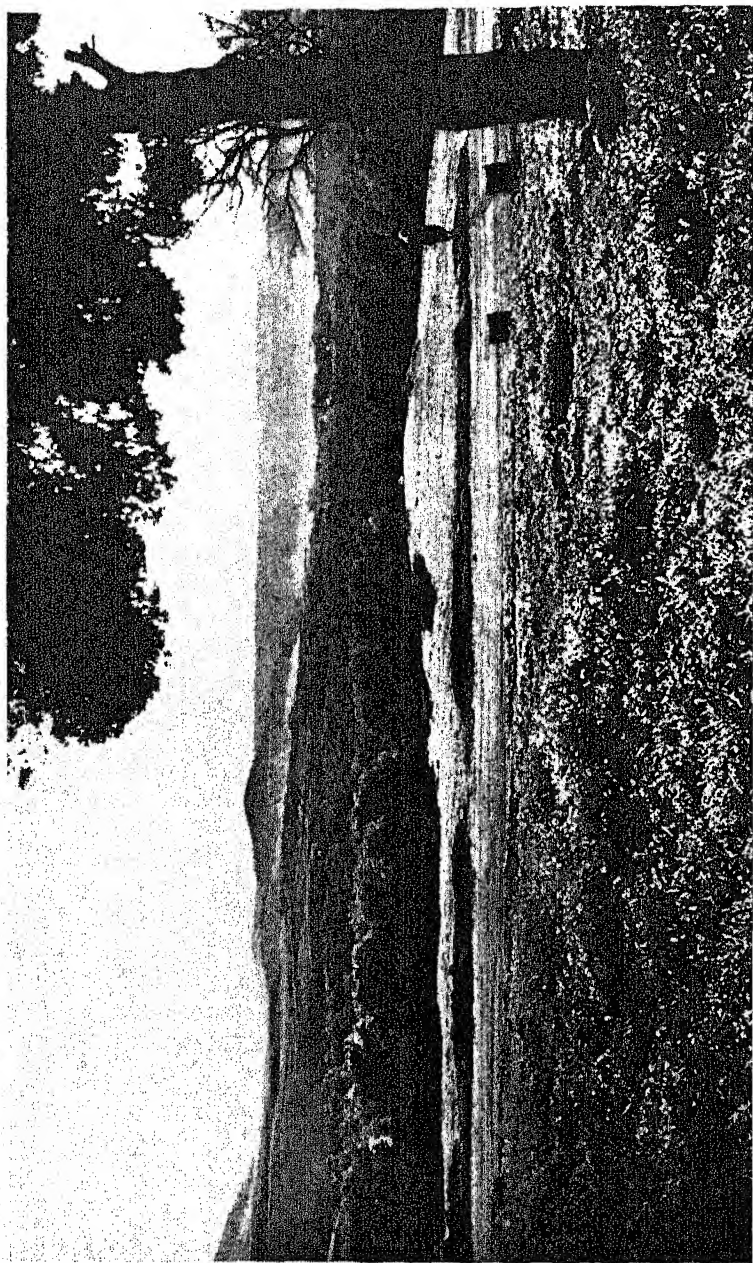
About a million olive-trees within the administrative area of Tunis, and vast numbers in the borderlands of the region, show the approximation to the conditions of the Sahel of eastern Tunisia. Nevertheless olives do not form an exclusive industry as they do in



20. *Cultivation near Thibar (between Béja and Teboursouk)*



21. *Djebel Goraa from Thibar: the monastery of the Pères Blancs in foreground*



22. Country between Souk el Arba and le Kef near Nebeur

the Sahels of Sousse and Sfax, because rain allows cereal crops to be grown. Moreover vineyards take first place with Europeans, both in large-scale French properties and in the smaller but very numerous Italian enterprises.

The coastal zone, consisting of Tunis and its environs, abounds with villages, scattered houses, and small properties. Especially in Manouba and around Ariana native families have their orchards, patches of wheat or barley, grazing land, and carefully tended olive-trees. Farther inland the land, almost without people or houses before the Protectorate was established, is given over to flourishing vineyards, each with its proprietor's house (or that of his agent) surrounded by plantations of trees. Where several small properties adjoin, houses are grouped in small communities.

The city of Tunis, on the western side of the Lac de Tunis, connected by a canal to la Goulette on the coast, is the capital and commercial centre of the Protectorate and a leading port (Photos. 17, 146, 149, 150, 153). It is a meeting place of roads and of the normal-gauge railways of northern Tunisia with the narrow-gauge system of the rest of the country.

Cap Bon differs widely from the rest of the region: isolated and divided into small but distinct cantons with a very mixed population, it supports villages and farms, but is aside from the routes of nomads or tribal influence. In some parts horticulture is dominant as at Nabeul, elsewhere there are large estates such as at Menzel Temime. Crops are very varied, and include cereals, olives, vegetables, oranges, and tobacco.

CENTRAL TUNISIA

(Fig. 11)

Central Tunisia lies between the valley of the Medjerda, the great chotts, the Lower Tell, the east coast, and the Algerian boundary. The relief in the north-west is dominated by folds that cross one another almost at right angles, resulting in domes and basins: towards the south and east the folds are spaced more widely, and their trends are variable. The country gives an impression of being sharply subdivided by relief, vegetation, and agriculture.

The High Tell and Dorsale

The High Tell lies between the valley of the Medjerda and the Dorsale or Backbone of Tunisia. The name High Tell is the more suitable because it owes its relatively plentiful rain to its altitude, in

spite of the presence of the northern Tell between it and the sea. It is a region of mountain and plain, of cultivated and uncultivated tracts, which lack the defined margins seen in western Algeria and Morocco, and are mixed up one with another. The structure is, as in other parts of Tunisia, mainly one of domes which occur in many forms—clear-cut with circular contours, as in Djebel Oust; half-domes sharply truncated by faults, the down-thrown part being concealed below the surface (for example, Djebel bou el Hanèche); small domes which combine to form a single structure (Djebel Bargou); and irregular domes in the mass of which are anticlines and synclines (Maktar massif).

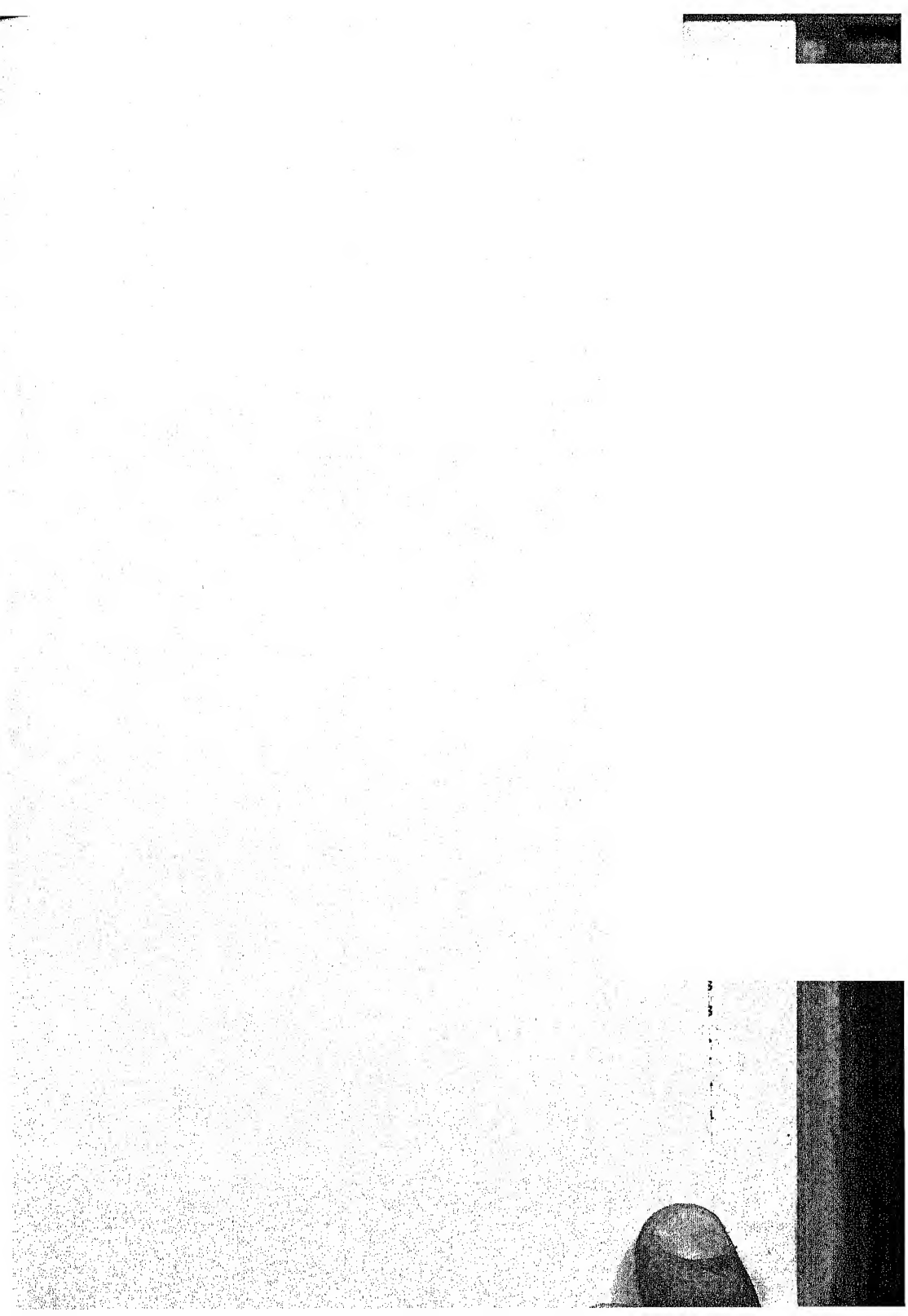
These structures, of limestones or sandstones, are alined from north-east to south-west, separated by basins parallel with them. The whole system marks the prolongation of the Saharan Atlas of Algeria. Thus the chains of le Kef and Teboursouk continue those of eastern Algeria (Photos. 20-23), and Djebels Hameima and Slatat follow the iron-ore domes of Djebels Ouenza and bou Kadra. Limestones form sharp and rocky ridges, known as 'kefs', like Dir el Kef which has given its name to the town of le Kef. Triassic marls are widespread, especially in the valley of the Oued Mellègue.

The mountainous country between the Medjerda and the Mellègue is wooded, has a severe climate, and is sparsely populated. The plateau is dominated by isolated peaks separated by cultivated valleys. Tilted and folded rocks cross the Medjerda valley between the Oueds Zarga and Siliana to join those of northern Tunisia.

The Maktar massif is an enormous elliptical dome, rich in phosphate, a continuation of the Tébessa region of Algeria. Limestones overlying the marls form outstanding and rugged features (*kalaa*), for example, the Kalaat es Senam (4,108 ft.) (Photo. 25).

The Thala chains prolong those of Tébessa and continue into the Zeugitane chain of Tunisia (the Dorsale), which is strongly marked only north-east of Djebel Serdj (4,124 ft.). The heights of Djebels Bargou, Fkirine, Zaghouan, Ressas, and bou Kournine mark a succession of limestone domes, rather than a true chain, interrupted by transverse gutters. (Photos. 16, 61). Djebel Zaghouan (4,249 ft.), standing more than 3,000 feet above the town of that name, is a great limestone dome, with sharp crests and precipitous walls some 1,000 feet high, bounded by a fault: it is the most striking mountain in Tunisia. Broken country stretches from it south-eastward through Takrouna, dominating the coastal plain around Enfidaville (Photo. 24).

The south-western part of the Tunisian High Tell lies near the





frontier with Algeria, and is continued westward in the region of Djebel bou Djellal. The highlands are crowned by Djebel Chambi (5,065 ft.), the highest point in Tunisia, and by Djebel Semmama, these two mountains being separated by a fault (marked by the valley of the Oued el Hatab). In the whole of this region the domes, separated by plains, recall the structure of the Saharan Atlas of Algeria.

The High Tell is divided by alluvial plains and high plains or *sraouat*; rivers mark changes of slope, draining basins, one below the other, which were once enclosed lakes. Grazing land, woodland, and cultivation alternate in small and well marked districts (Photo. 26). Cultivation spreads along valleys that descend to the steppes. There is no division into forest belt and cereal-growing belt such as may be seen in the northern Tell. Aleppo pine is dominant on the dry limestone, with juniper, rosemary, and alfa growing beneath, forming a sparse forest that often gives place to brushwood: occasionally alfa grows in clearings where the pine is dominant. On the marls and alluvial plains juniper gradually gives place to corn-land in the country around le Kef, le Sers, Siliana, and Teboursouk, but the broad plains which stretch between le Kef and Thala are bare and dry, almost steppe-lands, with tufts of alfa and associated plants.

In the northern part of the High Tell houses or *gourbis* (native huts, p. 154) predominate over tents, much of the population being sedentary; but the position is reversed in the south, where, since the climate makes cultivation uncertain, the majority of the people live in tents. Since the French established the Protectorate the improvement in cultivation has increased the sedentary population especially in the country around Teboursouk. Permanent centres of population depend on springs: springs irrigate gardens below which olives are planted; lower still cereals, usually dependent on rains, are grown. The districts of le Kef and Teboursouk provide examples of this arrangement.

Before the French protectorate insecurity was general in the High Tell, and villages were perched in inaccessible spots, every other consideration being sacrificed to that of defence. While some centres of population dwindled or barely survived, new townships such as Maktar arose, especially after the Protectorate, as a result of new needs. Most of these are either on the main routes or have better water resources than the old hamlets. The mining 'camps', especially for the exploitation of iron and phosphate, flourish or fall into ruin with the fortunes of the mine: but they have led to the construction of railways reaching the heart of the country, bringing small contingents

of Europeans into it. In the long run, however, only centres of population concerned with permanent commercial requirements are likely to become deeply rooted in the country by encouraging the extension of agriculture. European colonization is well founded in the country around Teboursouk. Land incompletely used by the native could be put to good use by Europeans in the plains of le Sers and les Zouarines.

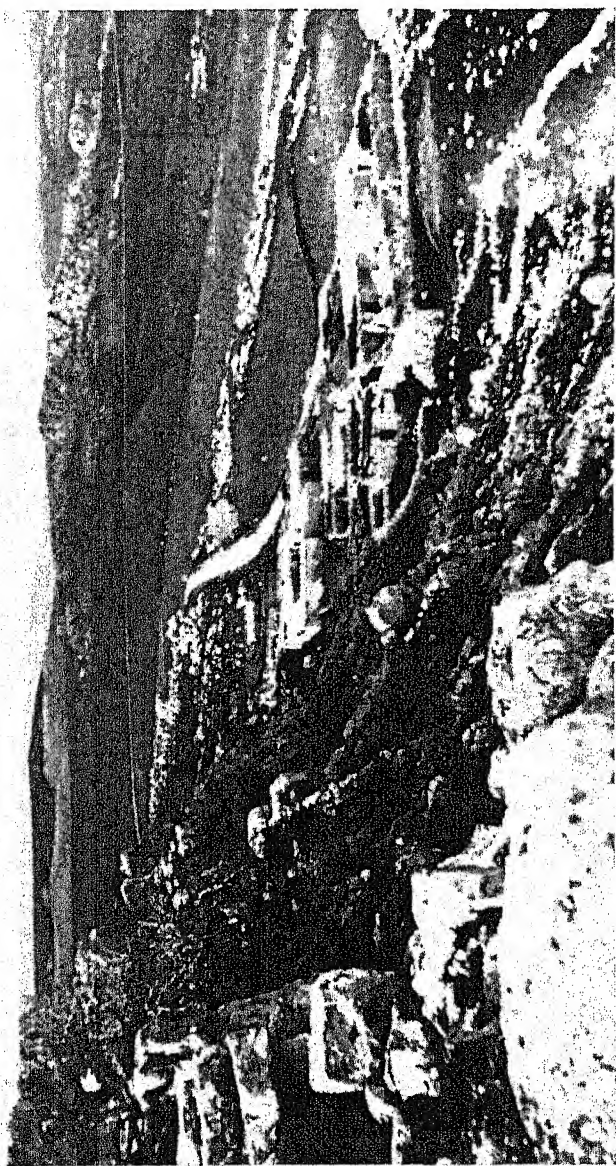
The Steppes

In a general way all country south and east of the Dorsale may be regarded as part of the steppes. Thus Thala and Maktar are in the Tell, and Fériana and Kairouan are in the steppes, which pass almost imperceptibly into the cultivated coastal plain or Sahel.

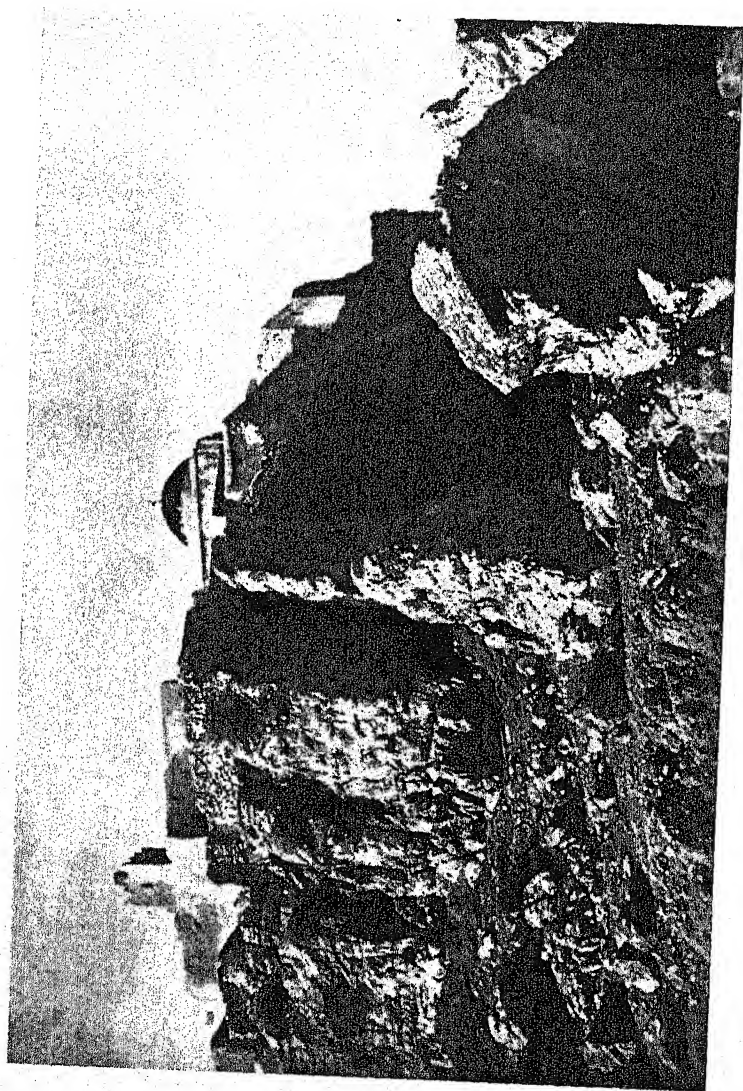
There are still parallel and discontinuous chains with plains stretching between them, but the plains are much more extensive than they are in the Tell, surrounding and isolating the chains. This type of relief becomes noticeable in the highlands between Kasserine and Tébéssa; on the northern flank of Djebel Chambi is the enclosed Foussana plain, drained by the Oued el Hatab, whereas on its southern side is a plain 60 miles wide, open to the east.

The chains of Fériana, Gafsa, and Seldja are the principal elevations of the region, and towards the south they are increasingly spaced out, like bare skeletons rising above the alluvial plain. The structure is rarely as simple as it appears, each line of high ground being in fact made up of several stumps of fold. The Fériana chain is marked by Djebels Serraguia, Selloum, and Mrhila: small massifs take diverse directions, completely isolated or joined together at various angles. Djebel Sidi Aich (3,376 ft.) is outstanding, with the Gamouda basin on its north-east. The Gafsa chain (Djebels Orbata and bou Hedma) is a well-marked anticlinal ridge running from west to east (Photo. 28). The Seldja chain, over 60 miles long, runs from Négrine to the vicinity of Gafsa; its vertical, jagged wall rises nearly 2,000 feet above the Chott el Rharsa (Photo. 29). A north-south axis of folding, marked by Djebels Sidi Naceur Allah and Sidi Kralif, separates the domes and folds of central and southern Tunisia or High Steppes from the eastern plains or Low Steppes.

The rare rains which water the steppes come principally from the Mediterranean and are brought by east winds, although the north-west wind also brings an appreciable rainfall. On account of the difference of relief of the High and Low Steppes, rainfall is a little higher in the former. Fériana and Gamouda thus have a greater rainfall



23. Country immediately north of Dougga (near Tebourouk)



24. *Takrouma*

than Sfax, and the Kaoub (Photo. 30) is a little less dry than the plain of Kairouan. Alfa flourishes on the steppes, especially on the well-drained sandy or calcareous soils, avoiding damp or saline depressions. Sparte grass grows lower down the slopes, and wormwood is found in clayey hollows. A few woods of pine or juniper have survived in the Fériana chain. There is a small area of gum-trees in Bled Talha, north-west of the Sebkha en Noual (Photo. 79). Large areas are, however, almost barren (Photo. 78). Water is often at slight depth and is reached by wells: it is nearly always saline.

The plain of Kairouan lies between Djebel Ousselat on the west, the Sebkha Kelbia on the north, the Sebkha de Sidi el Hani on the east, and the slightly marked heights of the right bank of the Oued Merguellil on the south (Photo. 33). It is a steppe, and the rainfall is insufficient for growing cereals without irrigation: good years are unusual, bad years are normal.

The Oueds Nebhane, Merguellil, and Zeroud, with their tributaries, coming from the mountains of the Dorsale and the High Tell, spread out in the plain (Photo. 31). Large, broad, flat, alluvial sheets formed by these oueds fan out, and water from rare but heavy rains fills the ravines and floods their lower parts for a few hours. The natives have built primitive barrages which enable them to use the flood waters of the streams. When the floods are sufficient to sink deeply into the ground, harvests are good, but flooding needs to be constant both in occurrence and in volume: if the floods are feeble or late irrigation is impracticable, if too strong they sweep everything away.

Kairouan was the first religious and military centre founded by the Arabs in north Africa (Photos. 32, 129, 130). The city is far from the sea in a monotonous steppe, and was, therefore, safe from the Byzantine fleet. The surrounding steppe is sparsely populated for the most part by camel- and sheep-owning nomads living in tents who have to seek pasture for their flocks in the Tell. The prickly pear is much used for fodder. Living conditions deteriorate from north to south. At Gafsa the first palm-grove is encountered, but the date-palm country proper lies to the south, around the Chott Djerid and Gabès (Photos. 28, 39). The Tunisian steppes seem to have been well populated under Roman rule; remains of works and buildings are very abundant (Appendix C). The Romans made extensive use of brooks and streams; traces of their retaining works are still visible. Moreover, they cultivated olives, and it is by olives rather than cereals that some degree of prosperity can be restored to the

steppes. So far the only wealth lies in the valuable phosphate deposits of Gafsa (Photos. 186, 187). The working of phosphate at Metlaoui (Philippe-Thomas) and Ain Moularès has brought about the building of two railways, from Sfax and Sousse; only the engineers and foremen are European, other skilled labour being unnecessary. The phosphate industry does not lead to European colonization.

The Sahel

The Sahel is no more than the cultivable part of the Tunisian steppes, which reach the coast south of Hammamet and are broken up by olive-groves, gardens, and houses. The northern margin of the Sahel is the southern edge of the Tell around Hammamet; the western margin is ill defined; it may be taken as the line of the sebkhas from the Sebkha Kelbia to the Sebkha en Noual, or as a line from Kairouan to Maknassy. The southern margin may be placed at about Maharès, south of Sfax, but might be extended to Gabès or Zarzis.

The vast plains of eastern Tunisia which flank the Golfe de Sirte are in easy communication with Tunis by way of the pass of Grombalia (at the western end of the Cap Bon peninsula) and with the far south by the Gabès gap. The plains rarely exceed an altitude of 800 feet. The solid rocks are almost completely hidden beneath a mantle of more or less recent deposits, generally sandy, with small hills of limy rocks. There are some traces of north-south displacements, notable at Monastir and Djemmal; moreover the sebkhas of Kelbia, Sidi el Hani, Cherita, and Meheguigue are alined north-south at the foot of the hills of the Sahel, of the el Djem plateau, and of the high ground of the district of Sfax. The drainage of the plains is imperfect, and the sebkhas, which were formerly much more extensive, are not directly connected with the sea. Eastern Tunisia is the graveyard of surface waters; between Hergla and the Oued el Akarit, a distance of about 180 miles, not a single watercourse reaches the Mediterranean.

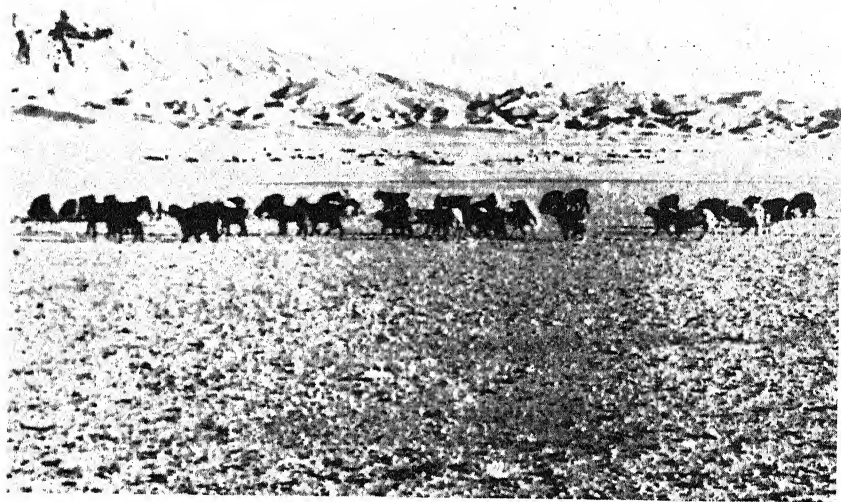
Altitude and proximity to the sea lead to specialized climate and vegetation. The rainfall is much below the 14 inches usually regarded as the minimum for regular cultivation in north Africa, but condensation, abundance of dew, and slight evaporation allow the cultivation of olives, if not of cereals, without irrigation; in addition the sandy soil retains moisture well, and sub-soil water is available. The Sahel is the home of the olive, and the area devoted to its growth has been considerably extended under the French protectorate, especially around Sfax. The European growers have associated the natives with



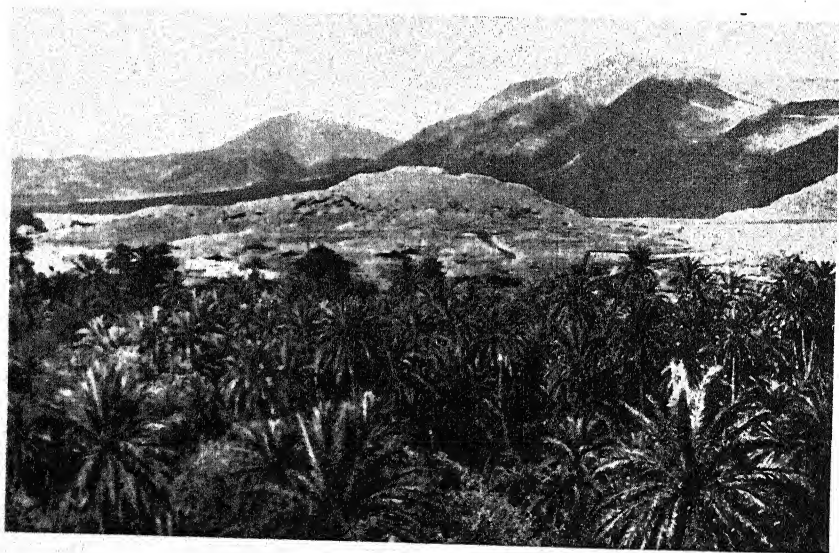
25. *Djebel bou Jabber from Kalaat es Senam*



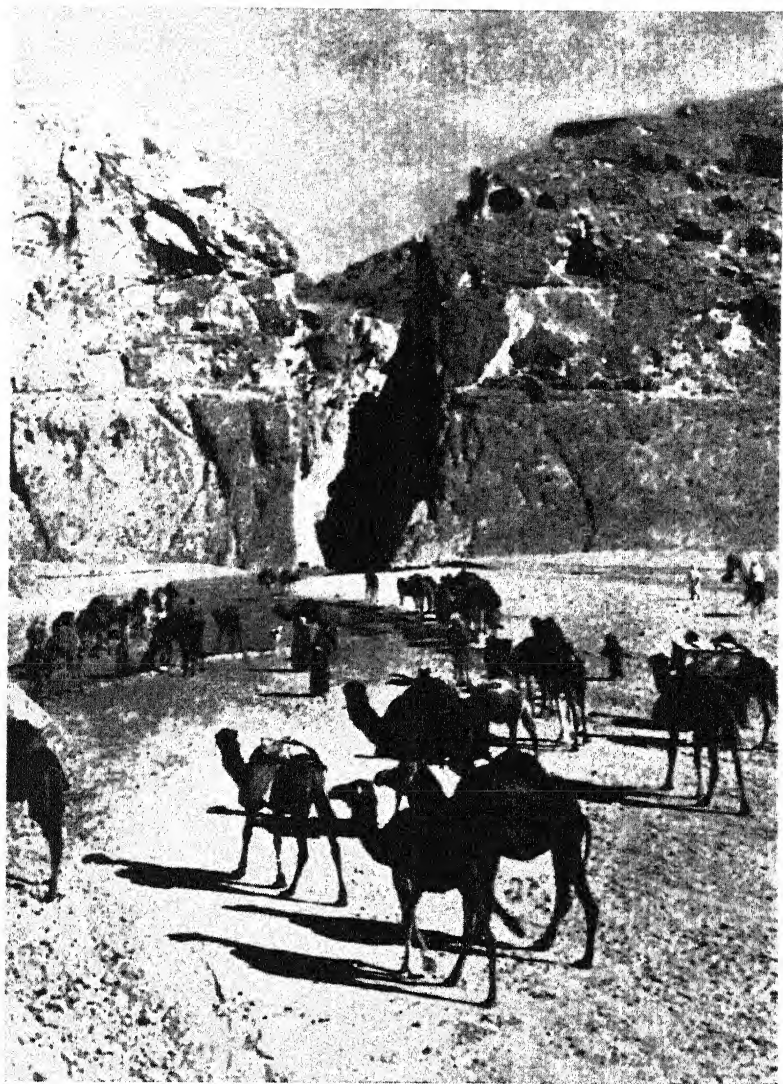
26. *Southern slopes of the Monts de Tébessa, north-west of Ain bou Dries*



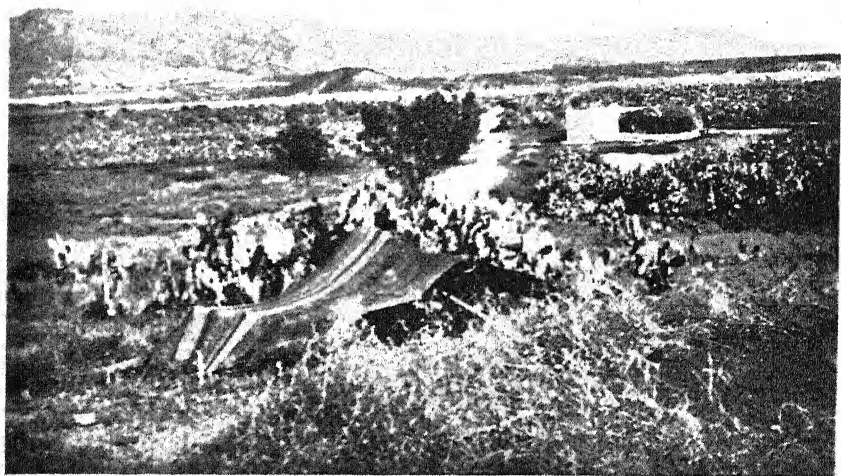
27. *Desert between Tozeur and Gafsa*



28. *Djebel Orbata and the Gafsa oasis*



29. *Gorge of the Oued Seldja*



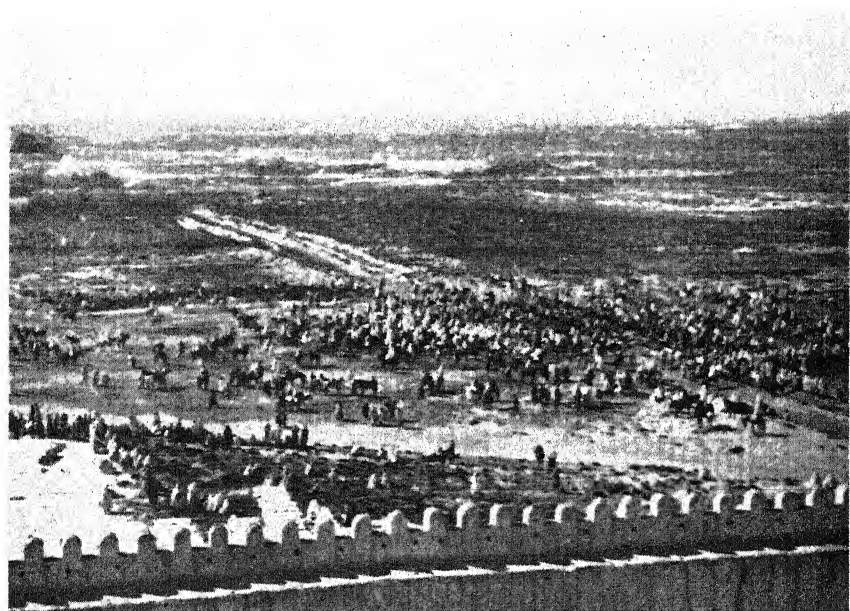
30. *Steppe in central Tunisia, Kaoub district*



31. *The Oued Zeroud*



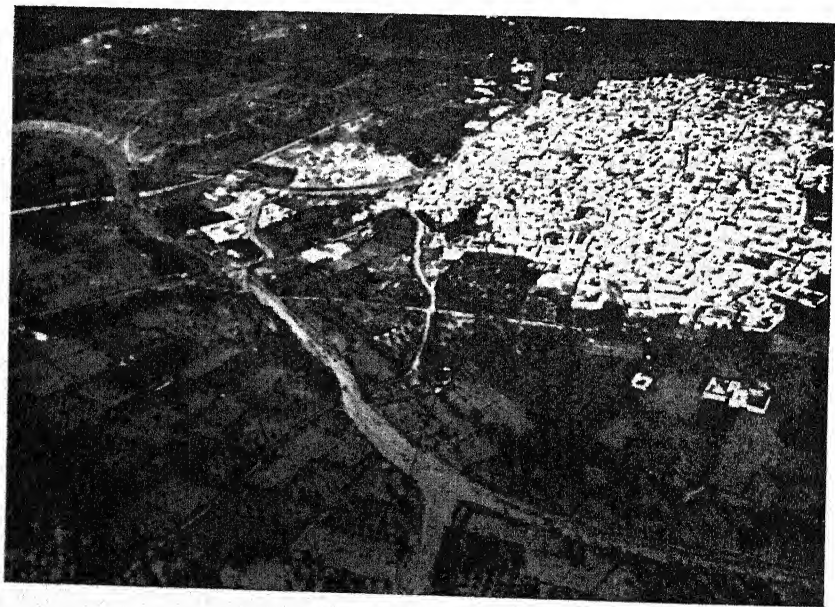
32. *Kairouan from the Great Mosque*



33. *Plain of Kairouan from the town wall*



34. Îles Kerkenna: dry-farming



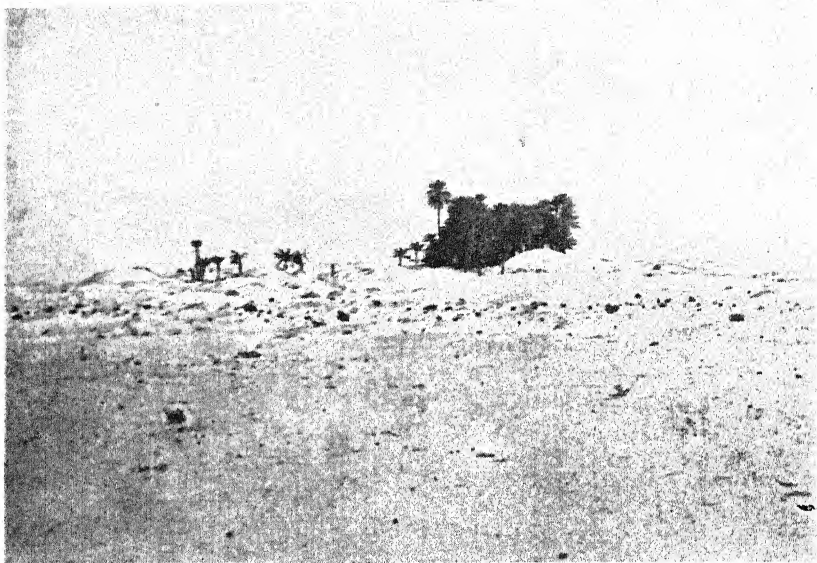
35. Kalaa Srira, Sahel of Sousse



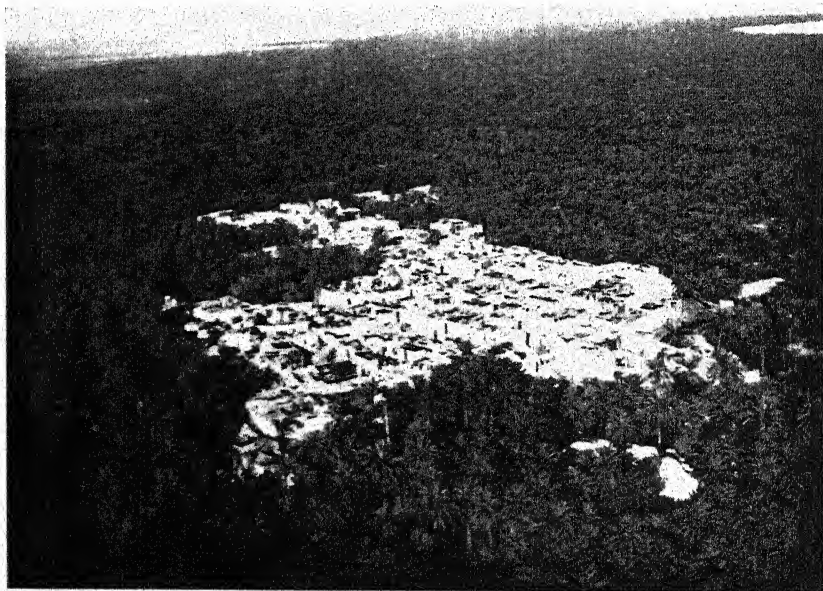
36. *Chott Djerid*



37. *Chott Djerid*



38. *Small oasis between Kebili and Douz*



39. *Village of Chenini in the oasis of Gabès*

the plantations in a system of farming called *mgharsa* (p. 281), at first around Sfax on lands called *terres sialines* (pp. 287-288), then on other lands.

The belt of cultivated Sahel includes a large proportion of the inhabitants of Tunisia, and contrasts with the wide empty spaces of the interior. The dense sedentary population engaged in olive-growing is grouped in villages and townships (*bourgs*).

The Sahel of Sousse stretches from Hergla and Sidi bou Ali in the north to Mahdia and Ksour Essaf in the south. Olive-growing depends on the use of the streams of the limy hill-slopes (*meskat*) for the trees in the basins (*manqa*), the waters being conveyed in wide, shallow trenches. The Sousse olive-growing area comprises about 6 million trees, and there are more than fifty villages and townships, including some of 10,000 to 20,000 people (such as Kalaa Kebira, Msaken, and Moknine) (Photo. 35). In the caïdat of Monastir there are only large villages, which are in some cases only 1 or 2 miles from one another. On the east the sea has provided security for the sedentary people and has prevented their encirclement by the nomads. Isolated houses are now springing up in the olive gardens, and dispersion of the population is taking place as the plantations spread inland.

The olive-growing area of Sfax contains more than 4 million trees, which are widely spaced so that their roots can get moisture from a wide area; the light soil is constantly broken up and scoured by hand-plough (*maacha*), the trees are severely and skilfully pruned in cup-shaped fashion, and the crop is gathered with the greatest care. Worthless country has been transformed into magnificent olive plantations, which, around Sfax, now stretch some 50 miles from the sea and rank with the vineyards of the Mitidja and the palm-groves of the Oued Rir (Algeria) as one of the outstanding achievements of the French in north Africa (Photos. 177, 179).

Olive plantations are also found south from Sfax; they cover a large part of the Île de Djerba and have more recently been established around Zarzis. It seems likely also that the plantations could be carried farther inland.

Modern ports have been established at Sousse, Sfax, and Gabès (Photos. 155, 156, 161, 166), and the necessary water-supplies have been made available by drawing on areas more or less remote from them; thus Sfax is supplied with water brought from the Oued Sbeitla, near Sbeitla, 105 miles away. Native and European oil refineries treat the produce of the plantations; there is a flourishing sea trade in olive-oil, and also in phosphate and alfa.

The east coast of Tunisia describes a curve between the Golfe de Hammamet and the Golfe de Gabès. North of Sousse it is very regular, and bordered by long lines of dunes enclosing lagoons. The small peninsulas of Monastir and Mahdia are islands joined to the mainland by accumulations of sand. South of Ras Kaboudia a broad submarine platform gives depths of less than 33 feet and in many places less than 3 feet. The coast of the Golfe de Gabès displays estuaries, lagoons, and sebkhas which seem to be remains of a recent submergence. The Îles Kerkenna (Photos. 34, 68) are separated from the mainland by very shallow water and on their margin are submarine canals called oueds, which seem generally to be independent of any river system past or present, and to owe their origin to the action of wave and tide on the loose and almost flat bottom. The Île de Djerba (p. 44) is separated from the mainland by depths of only a few feet. The fishing industry on the east coast of Tunisia is more flourishing than on any other part of the north African coast: sponge fishing between Monastir and Tripoli in particular represents considerable wealth (Photo. 190).

SOUTHERN TUNISIA

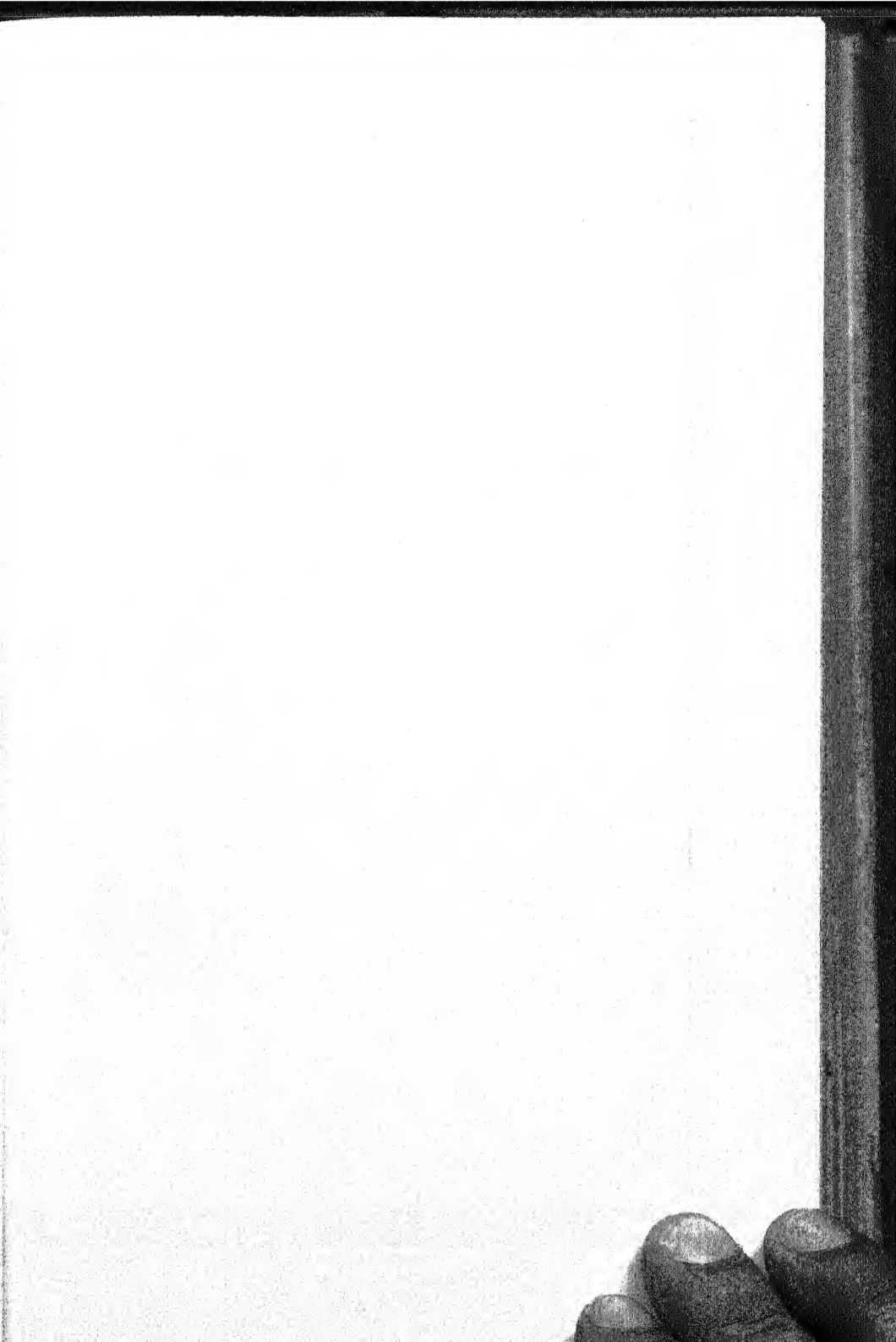
(Fig. 12)

Southern Tunisia consists of the great chotts of the south, the coastal plain from Gabès to the Libyan frontier, the escarpment and its outliers which dominate the coastal plain on the south and run far into the Sahara, and the sand-encumbered lowland between the escarpment and the great chotts. The whole region is arid, and most of it is almost uninhabited desert (Photo. 27): there are few settlements apart from the rich palm and olive plantations in the neighbourhood of Gabès and the chotts.

The Chotts and Palm-groves

The chains of the Chott el Fedjadj are the most southerly of the Atlas. Djebel Cherb, which runs in an ellipse from Tozeur to Gabès, and Djebel Tebaga south of the chott are regarded as two parts of an enormous dome of which the centre has foundered, thereby giving rise to the chott. The general direction of the chains is east-west, but they are in fact made up of a large number of domes running south-west-north-east, separated one from another by narrow clefts following the same direction.

The great Algerian-Tunisian chotts form a system of muddy and saline depressions stretching for about 230 miles from west to east



from the vicinity of Biskra in Algeria to that of Gabès. The Chott el Rharsa, 69 ft. below sea-level and with an area of 500 square miles, is separated from the Chott Djerid by the Kriz sill. The Chott Djerid, 52 feet below sea-level with an area of 190 square miles, is covered with a salt crust below which water lies; the water often seeps up in the middle of the lake (Photos. 36, 37). The eastern part of the chott is restricted and is called the Chott el Fedjadj. The Gabès gap, between the chott and the sea, 154 feet above sea-level, is filled with alluvium and sand-dunes, and is regarded as an isthmus of Cretaceous age. The great chotts do not seem ever to have been joined to the sea and they owe their origin to depression.

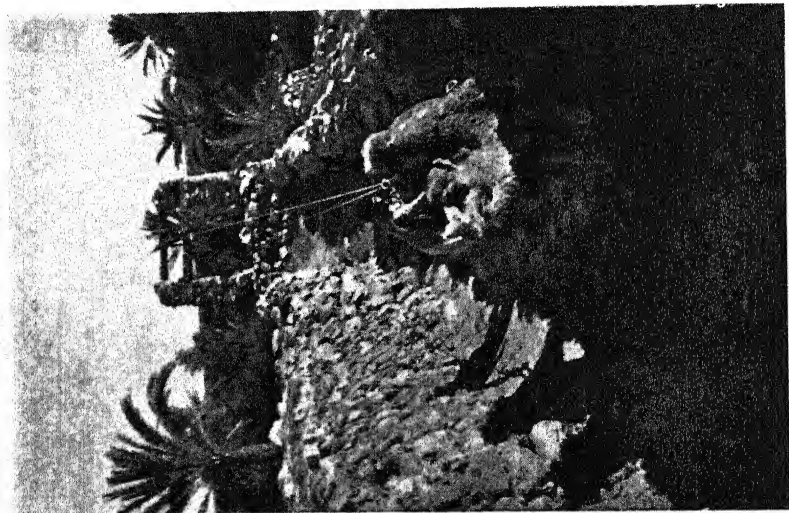
The valuable date-palm groves of the Djerid are located on the Kriz sill and have a population of 22,000; there are about 900,000 trees, of which 320,000 are around Tozeur, 240,000 at Nefta, 180,000 at el Oudiane, and 80,000 at el Hamma (Photos. 45, 136, 137, 182). Another large group of palms is located in the Gabès gap (Photo. 39). Like the Ziban oases in Algeria the palm-growing areas are watered from Cretaceous and Eocene limestone chains lying to the north.

The Nefzaoua district south-east of the Chott Djerid rarely rises as high as 500 feet above sea-level: there are small oases, some of them little more than a group of wells, having limited water-supplies. Mobile sand-dunes constantly threaten many of these oases. The most considerable group lies in the Kebili district, south-east of the Chott Djerid: about forty small oases are spread out to the west and south-west of Djebel Tebaga and on the edge of the Chott Djerid (Photos. 38, 41, 80, 181). There are about 500,000 palms (80,000 in Kebili itself), irrigated from artesian wells: screens are built to prevent encroachment by sand-dunes (Photo. 40). Kebili is the administrative centre for people dependent on these oases.

A route called the Tri el Oudiana, practicable for motor-cars from early March to September, crosses from the Kebili oases to the fertile Djerid district between the Chott el Rharsa and the Chott Djerid: some sections of the route may be treacherous after rain. There is also a track across the Chott el Fedjadj from Kebili to the Gabès-Gafsa road. The oases as a whole are connected by motor roads with one another and to Sfax via Gafsa and to Gabès via Kebili.

The Tunisian Sahara

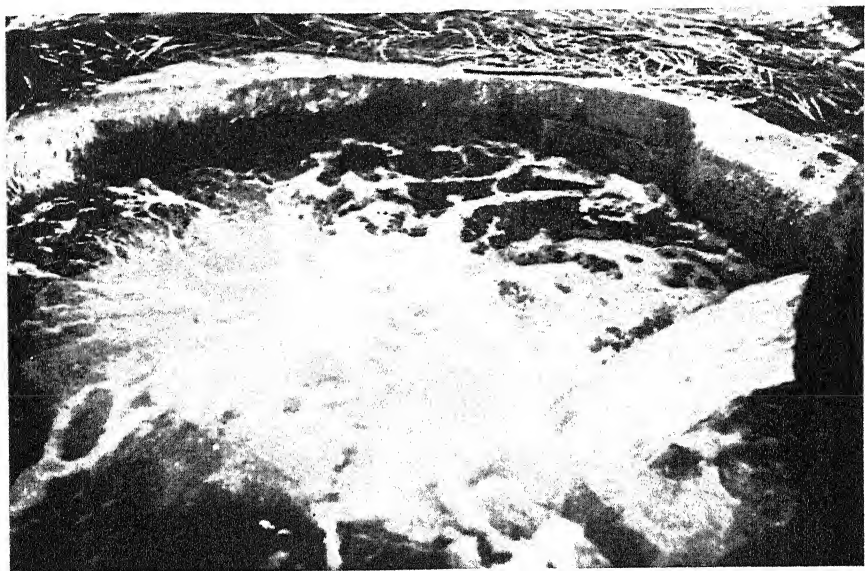
South of Gabès and the great chotts lies a very different country, essentially Saharan in climate, relief, and structure; there are no folded chains, and it forms no part of Barbary. Extensive plateaux worn into



42. Well at Ghoumerassen near Foun Tatalhouine



43. Artesian water at Lala near Gafsa



44. *Artesian water at el Hamma du Djerid*



45. *Tozeur oasis*



46. *Matmata*



47. *Djefara plain between Médenine and Ben Gardane*

They are about 1,300 feet high in the north, rising southward to 2,000 feet or more (Photos. 46-52).

Much of the area is involved in the French frontier defence system. The military headquarters of the Tunisian Sahara are at Bordj le Bœuf, about 20 miles south-west of Remada (Photo. 54).

Dehibat is the only village of any note near the Libyan boundary. It consists of eighty-five cave-dwellings which, with fortified villages (*ksour*) and fortress-like storage chambers (*ghorfas*), are peculiar features of the Monts des Ksour (p. 155; Photos. 103-105).

The extreme south of Tunisia is a lowland, sand-encumbered on the west, and on the east seamed by oueds and drainage channels rising in the denuded limestone plateau of the Libyan frontier (Photos. 53, 55). It contains a number of water-points, is almost uninhabited, and is traversed by the military road from Dehibat to Fort Saint, opposite Ghadames, and by a few other tracks.

NOTE ON UNDERGROUND WATER IN TUNISIA

The following note should be read in conjunction with pp. 15-27, the geological map (Fig. 4), and Appendix A (Stratigraphy). Reference should also be made to Chapters IV (Climate), X (Population), and XI (Ports). No attempt is made to list or describe water-points, of which there are many thousands in Tunisia. Underground supplies of water depend primarily on the amount, incidence, and distribution of rainfall: along the north coast the annual rainfall is usually 30 to 40 inches, and locally 60 inches; southward it dwindles to less than 8 inches in the depression of the great chotts, and the escarpment east of it receives about 12 inches. It would seem therefore that available underground supplies would dwindle from north to south. Losses are suffered by evaporation, either by exposure of water at the surface or by vegetation, and by run-off in rivers flowing to the sea: northern Tunisia, with its vegetation cover and seaward drainage therefore loses a substantial part of rainfall otherwise available for absorption, whereas in the rest of the country there is no run-off to the sea, scanty vegetation or none, and wide exposures of permeable rocks.

The efficiency with which water is absorbed by the ground depends on permeability: the various clays and marls of the stratigraphical column given in Appendix A are impermeable, or nearly so. The remaining rocks fall into two groups: alluvial sands and gravels, dune sands, sandstones and associated rocks, all of them fairly porous, and limestones through which water may pass by joints and fractures, although the rock itself may be impermeable. Of the rocks depending on porosity for their permeability the Eocene sandstones are most widely exposed in the northern Tell, the

alluvial deposits occur in valleys of the north, and kindred detrital deposits occur over an increasing area from north to south until the Sahara is reached. A substantial part of the Tunisian Sahara is encumbered with sand-dunes, which are porous, lying locally on subjacent porous rocks.

Of the rocks depending on fissures for their permeability the limestones are exposed in most of the djebels of the High Tell and Dorsale and of central and southern Tunisia. Some water passes directly into the fissures; the rest is likely to flow at once to the plains where much of it is absorbed by porous rocks: a proportion is retained at, or returned to, the surface in chotts throughout the country where it suffers much evaporation and concentration of salinity.

It will be appreciated from what has been said above that, despite the failure of rainfall from north to south, the south is well adapted to receive and conserve underground much of the water it receives at the surface. Moreover, the disposition of the rocks and the underground migration of water which suitable disposition fosters are well adapted in some parts of the centre and south to provide large bodies of subsurface water, much of it artesian (Photos. 42-45).

The following is a summary of the water-bearing properties of the main rock groups.

Porous Aquifers

These usually give steady yields: the water may be excellent to undrinkable according to the amount of dissolved salts present: the water is usually bacteriologically of good quality, but may be polluted at or near the surface of the ground.

Quaternary. The marine deposits of the coasts occur in belts often too narrow to hold water, but they have been largely exploited in the Cap Bon peninsula, particularly at Nabeul and Hammamet: the water is rich in chlorides.

The continental Quaternary deposits are valuable water-bearing beds. In the river valleys draining to the sea, like the Medjerda, the water is of excellent quality, but in closed basins, with salt lakes, it may be poor.

In the great plains of central Tunisia infiltrating rain-water may be retained by thin impermeable clays at slight depth, and in these circumstances the inhabitants have dug pits. There are many thousands of wells, for example 3,770 in the Île de Djerba alone. The water may be fit for irrigation and animals, possibly for drinking purposes. The Quaternary beds frequently cover permeable Tertiary or Cretaceous rocks, from which water may be derived: thus the artesian water of Gabès is considered by some to come from buried Cretaceous limestone. Some of the artesian wells of southern Tunisia (including Djerba) may draw their supplies from deeper sources, for example from Quaternary beds which pass down into Pliocene strata.

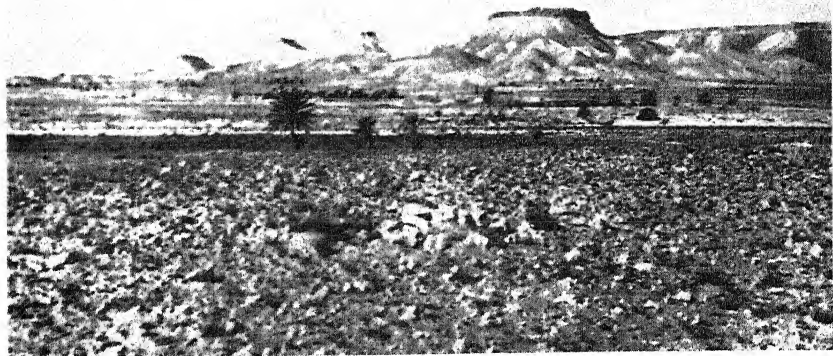
Pliocene. Pliocene sands are probably responsible for the artesian supplies at Zarzis and at Houmt Souk (Île de Djerba). Lower Pliocene



48. *Douirat near Fom Tatahouine*



49. *Tamezred near Matmata*



50. *Djebel ed Darhariet, south-west of Foum Tatahouine*



51. *Cultivated terraces at Douirat*

or Upper Miocene (Pontian) alternating sands, pebble beds, and marls provide one of the most prolific aquifers in the country, and they play a vital role in the settlements and economic development of south-central and southern Tunisia where they are the richest water-bearing formation. They are generally permeable and frequently well placed to receive the run-off of adjacent formations. They supply springs and bores especially in and near the palm and olive-growing oases of Gafsa, Tozeur, Nefta, Kebili, and elsewhere. On the Algerian frontier Pliocene sandstones resting on Cretaceous (Senonian) marls supply a large number of springs on the Bou Dries plateau (west of Djebel Chambi).

Miocene. In addition to the Pontian (Mio-Pliocene) beds mentioned above there are Lower Miocene sandstones which yield appreciable quantities of water in northern and north-central Tunisia.

Oligocene and Upper Eocene. The Oligocene sandstone is often coarse with associated fine gravels and occasional thin clays: frequently it is nearly 1,000 feet thick, is water bearing, and supplies lines of small springs which are thrown out by the impermeable clays: big springs are uncommon. The underlying Upper Eocene sandstones maintain seepages of good quality: they rest on Middle Eocene marls.

Fissured Aquifers

These give yields which may vary widely with the season or natural storage capacity: the water is likely to be hard in the limestones, and may be contaminated bacteriologically even at depth.

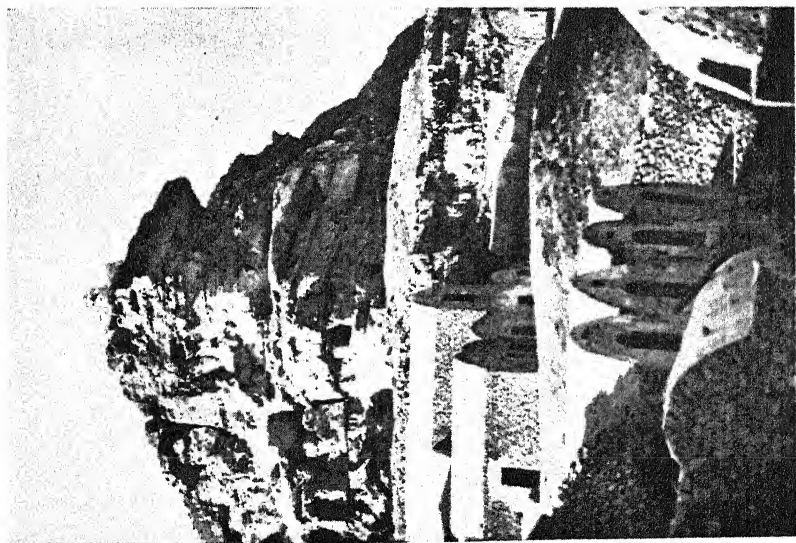
Lower Eocene. These limestones are important aquifers and many natural springs and bores occur in them. Springs are very numerous in them, especially in northern Tunisia, the High Tell, and the Dorsale. Mention may be made of a spring at le Kef which yields 24,000 to 125,000 gallons per hour and others at Djebel el Houd and Kesra. The limestones have been much used in the syncline of the Oued el Kebir, south-west of Pont du Fahs, for the water-supply of Tunis (p. 255).

Upper Cretaceous. Senonian, Turonian, and Cenomanian limestones are water bearing, but the second and third, measuring 50 to 150 feet in individual thickness, give comparatively little water owing to the generally poor catchments. Limestones associated with Senonian marls provide springs in many parts of the country, including Thala, Souk el Djemaa, Mrhila, Semmama, Sbeitla, and Matmata. Of these the Sbeitla spring comes from a widespread Upper Senonian (Campanian) limestone from 150 to 300 feet thick, yielding 200,000 gallons per hour. Its waters are led by an aqueduct to Sfax. The Semmama and Mrhila springs come from flaggy limestones some dozens of yards thick which form the base of the Senonian. The Matmata supplies, from limestones of the same age, give reason to suppose that water might be obtained from the Cretaceous and Jurassic limestones of the Saharan escarpment farther south if bores were correctly sited.

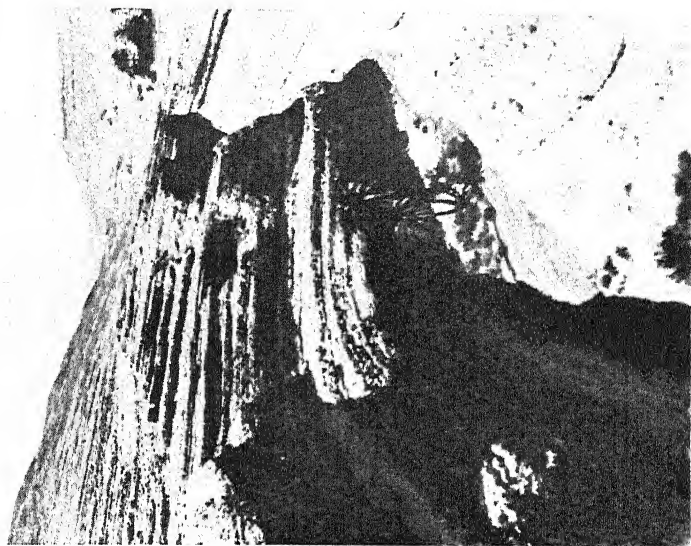
Lower Cretaceous. These limestones supply many important springs in the Dorsale region, several of which are used in the water-supply of Tunis. One of these generally gives 20,000 to 200,000 gallons per hour (in 1921, 1,000,000 gallons per minute). The best known springs are from Djebels Bargou, Serdj, Belouta, and Mrhila.

Jurassic. Limestones exposed in the cores of domes along the Dorsale near Tunis yield copious springs of excellent quality, as at Djebels Ressas, Zaghouan, and Fkirine: they are in large measure used to supply Tunis and the neighbourhood. Three springs, giving water of good quality, have given 24,000 gallons per hour in summer and 125,000 in the rainy season; 30,000 to 135,000; and 23,000 to 32,000 (regular).

Trias. Water associated with Triassic rocks is saline and unusable.



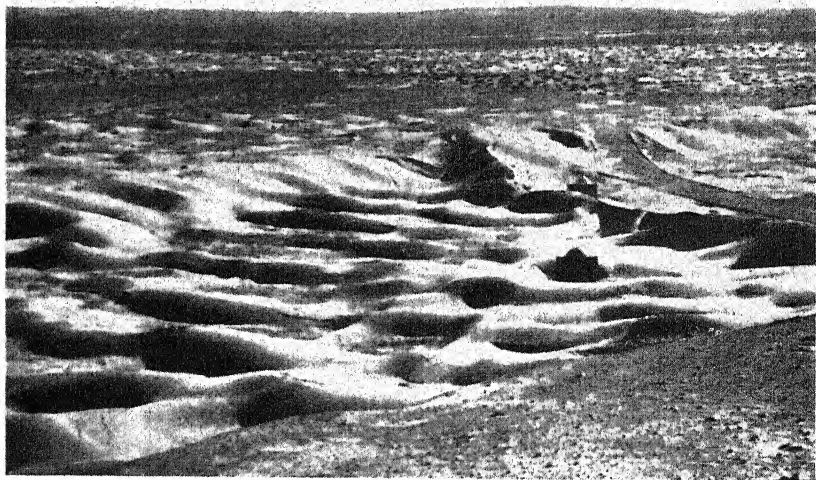
52. Ghomerassen



53. Gorge in the Monts des Ksour near the Libyan boundary



54. *Bordj le Bœuf*



55. *Dunes in the bed of a oued, Djeneien*

CHAPTER III

THE COAST

THE following is an account of the coast of Tunisia in which, owing to the progress of the war, no special emphasis is laid on the location or condition of landing beaches. Details of anchorages and depths can be found in *The Mediterranean Pilot*, volume i. The geographical characteristics of the coastal zone are described in Chapter II, and the ports in Chapter XI. The names given are those most commonly found on French maps of Tunisia (especially those on the scale of 1 : 500,000), except where well-known conventional English names exist, e.g. Bizerta, not Bizerte: appreciably dissimilar names used on other French and British maps and charts are also given.

The distances given in the text are approximate and refer to those measured along the coastline. In each section the physical features of the coast are described first, and the communications are summarized separately. Figs. 13-17 give the location of most of the places mentioned in the text, and show the principal communications, but not tracks.

GENERAL SUMMARY

TUNISIA faces the sea on two sides, and the two coasts have markedly dissimilar characteristics. Physically, Tunisia consists of the extreme end of the Atlas mountains with adjacent lowlands, separated from an upland region in the south-east by the Chott Djerid, which is below sea-level. The north and north-east coasts show the bold headlands separated by bays which mark the ridges and valleys of the highland region: the east coast from Cap Bon to the Libyan frontier is for the most part low and sandy, and slopes gradually below a shallow sea. Northern Tunisia is characterized by very complicated relief, but the general trend of the ranges is from north-east to south-west and throughout much of the north coast the highland rises steeply from the sea, the coast itself being marked by cliffs. The main river is the Oued Medjerda, which carves a wide valley and reaches the sea in a delta just south of Cap Farina on the north-east coast. This delta has been gradually built up, and the coastline has moved steadily eastward. The alluvium has been

deposited in an old gulf, the Golfe d'Utique (Utica), which it has gradually filled up, and the headland of Cap Farina diverts the sea currents so that they do not clear the river mouth. The ancient town of Utique (Utica) was, as late as the fourth century A.D., on the coast, and is now 6 miles inland.

The highland approaches the sea closely only along the north coast and in the Cap Bon peninsula. Along the east coast are the littoral plains of Sousse and Sfax, locally known as the Sahel. This coast is characterized by the numbers of lagoons bordering the coast and the shallow water off shore, making the provision of good harbours very difficult. The northern seaboard has in Bizerta and Tunis two of the finest natural harbours on the entire north African coast. The harbours on the east coast have been artificially constructed and require constant dredging.

Of the numerous islands and groups of islands off the coast of Tunisia, only the Zembra, Kuriate, Kerkenna, and Djerba islands are described here.

The north coast, except in the neighbourhood of the towns, is sparsely populated, but the east coast with its fertile plains between Cap Bon and Sfax has a comparatively dense population (Fig. 36). Farther south the desert approaches the sea, and the oases are the only important settlements.

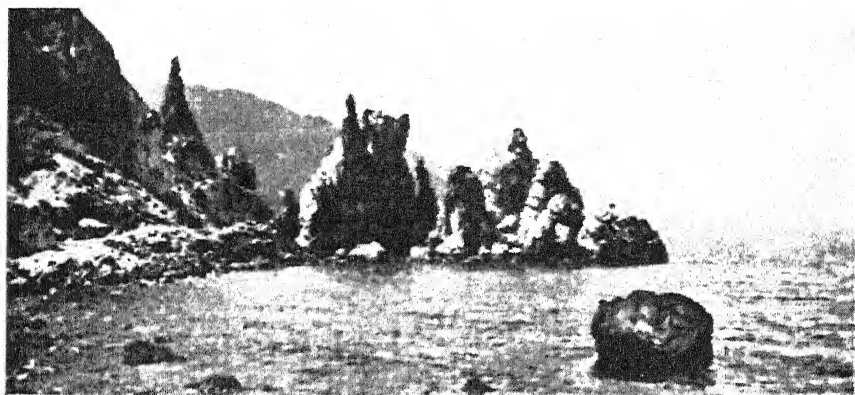
DETAILED DESCRIPTION

NORTH COAST (ALGERIAN BOUNDARY-CAP BON) (Figs. 13-15)

THE north coast of Tunisia is similar in character to the Algerian coast. It is backed by highland which is a continuation of the Atlas mountains and dominates the form of the coastline. The coast, in general, is rocky with numerous sandy beaches separated by steep cliffs.

Algerian Boundary-Cap Farina (105 miles) (Figs. 13, 14)

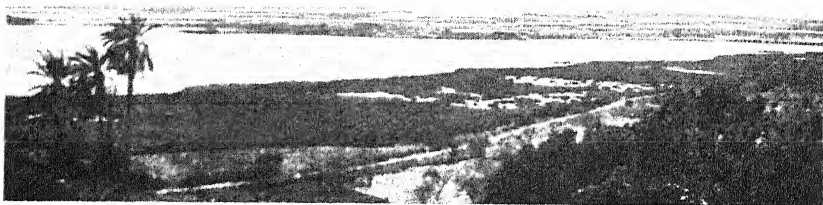
The boundary between Algeria and Tunisia lies about 2 miles east of Cap Roux, and between this cape and Cap Tabarka ($6\frac{1}{2}$ miles) the coast trends east-north-eastward and is high and indented. It is backed by forested cliffs, separated by sandy beaches fringed with rocks. About 5 miles from Cap Roux, Pointe Galina (Fidh ed Debouba) juts out; it is a low, scrub-covered promontory. About $1\frac{1}{2}$ miles east of Pointe Galina is Cap Tabarka with rugged cliffs fringed with rocks; the small port of Tabarka (p. 233) is about three-



56. *Tabarka: Pointe des Aiguilles*



57. *Île de Tabarka*



58. *Porto Farina*



59. *Sidi bou Said*

quarters of a mile south-east of the cape. The Île de Tabarka lies a quarter of a mile off shore, and is surrounded by rocks and shoals. It is connected to the mainland at its southern end by a shallow bar on which is a rubble breakwater (Photos. 56, 57, 138).

From Tabarka the coast trends north-eastward for about 32 miles to Cap Serrat. It is low and backed by sandhills: farther inland lies hilly country. Between Tabarka and Cap Négro there are conspicuous sandhills across which several rivers make their way to the sea: at Tabarka the Oued el Kebir enters the sea after crossing the Labhera marsh. The sand-dunes which border the coast from here to the north side of the Oued Zouara, about 10 miles east of Tabarka, make access inland very difficult. A ridge of highland runs close to the coast from the Oued Zouara for about 11½ miles and reaches a height of 1,562 feet in Kef Budmah, 1 mile south-east of Cap Négro. The cliffs slope very steeply to the sea and are crossed by many small streams. On the southern side of Cap Négro is Budmah bay, which provides shelter, but the northern side is fringed with rocks and the holding ground is poor. North-east of Cap Négro the coast is similar in character as far as Sidi Mechrig (Mishrik) bay, 8 miles north-eastward: it is rocky and indented, with short stretches of beach, and high ground inland. Between Sidi Mechrig and Cap Serrat, 7 miles to the north-east, an undulating plain about 200 to 260 feet high slopes gently to the sea, becoming steeper and more rocky near Cap Serrat. A range of hills runs parallel with the coast behind this plain. Immediately east of Cap Serrat the coast is higher, sloping down to the bay where the Oued Ziatine reaches the sea. The coast between Cap Serrat and Ras Aluglea, about 11 miles farther east, is rocky and indented, but not very high. The hills behind are scrub-covered and sparsely populated.

From Ras Aluglea the coast is rocky, and the cliffs much steeper. It trends in a north-easterly direction, with the rugged Mogods rising behind it, and as far as Ras el Dukara is similar in character to the previous stretch of coastline. East of this point the coast consists of low cliffs and rocks, with here and there a sandy beach rising inland to a ridge of highland. From Ras el Dukara to Ras Enghela, 9 miles farther north-eastward, the coast is backed by mountains and consists mainly of low cliffs and rocks, with occasionally a sandy beach. Ras Enghela itself is low (56 ft.) and rocky. Between Ras Enghela and Cap Blanc, 4 miles eastward, the coast rises gradually in height. The beach is sandy at first with some dunes, followed by cliffs which attain their greatest height in Cap Blanc. Cap Blanc juts out north-

ward from the coast, the seaward sides being vertical white cliffs. It is a conspicuous headland, with a signal station about half a mile southward of the extremity of the cape.

Cap Bizerte (Guardia) is $1\frac{1}{4}$ miles east-south-eastward of Cap Blanc, and from it the coast trends southward for $3\frac{1}{2}$ miles to Bizerta

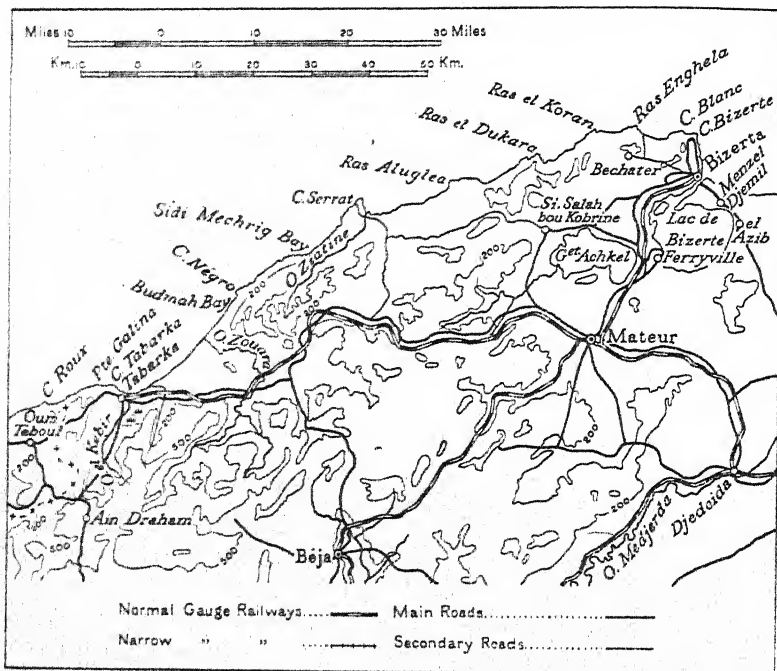


FIG. 13. The coast: Algerian boundary to Bizerta. Heights are in metres

The symbols used in this map also apply to Figs. 14-17, together with the following abbreviations: C. (Cap), Dj. (Djebel), G^{te}. (Garaet), I. (Île), O. (Oued), Pte. (Pointe), S. (Sebkha, Sebkret), and Si. (Sidi)

(p. 236). A ridge of highland lies about 1 mile inland from the coast. In the northern part the coast is bordered by small cliffs fringed with rocky flats, but farther south it is sandy. Bizerta Road is the bay between Cap Bizerte and Ras Zebib, about 15 miles east-south-eastward: the harbour and entrance to the Lac de Bizerte are on the western side of the bay. From Bizerta a sandy beach extends for about 4 miles east-south-eastward. The coast then continues $6\frac{1}{2}$ miles eastward to Ras Zebib: it is rocky and backed by sand-dunes and hills. It is unsuitable for landing, and there are no roads. Behind



60. *La Marsa: view east towards Sidi bou Said*



61. Carthage: the old harbour with Djebel bou Kournine in background

Ras Zebib the land rises to a ridge of highland, Djebel bou Choucha, reaching 840 feet. The small fishing-harbour of Tournarha is just east of Ras Zebib, and from here the coast trends east-south-eastward for about $11\frac{1}{2}$ miles to Cap Farina (Ras Sidi Ali el Mekki, Ras et Tarf). At first the shore is rocky, but then it changes in character, being backed by sand-dunes, and rising again to cliffs in Djebel Fartas. The coast continues to be rocky, steep, and inaccessible for 1 mile farther south-eastward as far as the mouth of the Oued Namouna. From the river mouth a sandy beach extends for $1\frac{1}{4}$ miles eastward: thence as far as Cap Farina the coast is again rocky. Cap Farina has two conspicuous conical-shaped hills, 393 and 321 feet high, close behind the cliffs.

Communications. Road communications inland along the coast between Cap Roux and Cap Farina are not good owing to the proximity of the highland to the coast. The main road from la Calle to Bizerta and Tunis runs inland to Oum Teboul, then back to the coast at Tabarka, and from there it is more or less parallel to the coast, but about 10 miles inland. Few tracks lead inland from the coast to this main road. A path follows the coast closely between Cap Roux and Cap Tabarka, but access to the main road between Oum Teboul and Tabarka is difficult. Farther east access inland is equally difficult across the lowland area between Cap Tabarka and Cap Négro. There are few tracks across it: one passes inland from the mouth of the Oued bou Terfess, $2\frac{1}{2}$ miles east of the Oued el Kebir, and turns across the lowland to run parallel with the coastline about 4 miles from it, and another track goes inland from the north-east side of the mouth of the Oued Zouara to meet the first about 5 miles upstream. The railway from Tabarka to Tunis runs close to the coast as far as the Oued bou Terfess, and then turns inland to run with the main road along the foot of the Kroumirie, thus avoiding the sandy and marshy area nearer to the coast. Exits from the region of Budmah bay are difficult: there are a few narrow tracks leading inland, but no motorable roads of any kind. Farther to the north-east tracks lead inland from Sidi Mechrig bay and from the mouth of the Oued Ziatine. A narrow road leads from the lighthouse on Cap Serrat, and, with these tracks, joins the main Tabarka-Bizerta road. Another track branches off the road from Cap Serrat and, running parallel with the coast, joins the Tabarka-Bizerta road at Sidi Salah bou Kobrine close to the Garaet Achkel. There are many narrow tracks across the Mogods between the coast and the main road to Bizerta, but, with the exception of the roads at the eastern end between Bechater and Bizerta, all are poor and

narrow. A narrow track follows the coastline from the bay east of Ras el Dukara to within 1 mile of Ras Enghela, and on the eastern side of Ras Enghela a motorable road leads inland to the Bechater-Bizerta

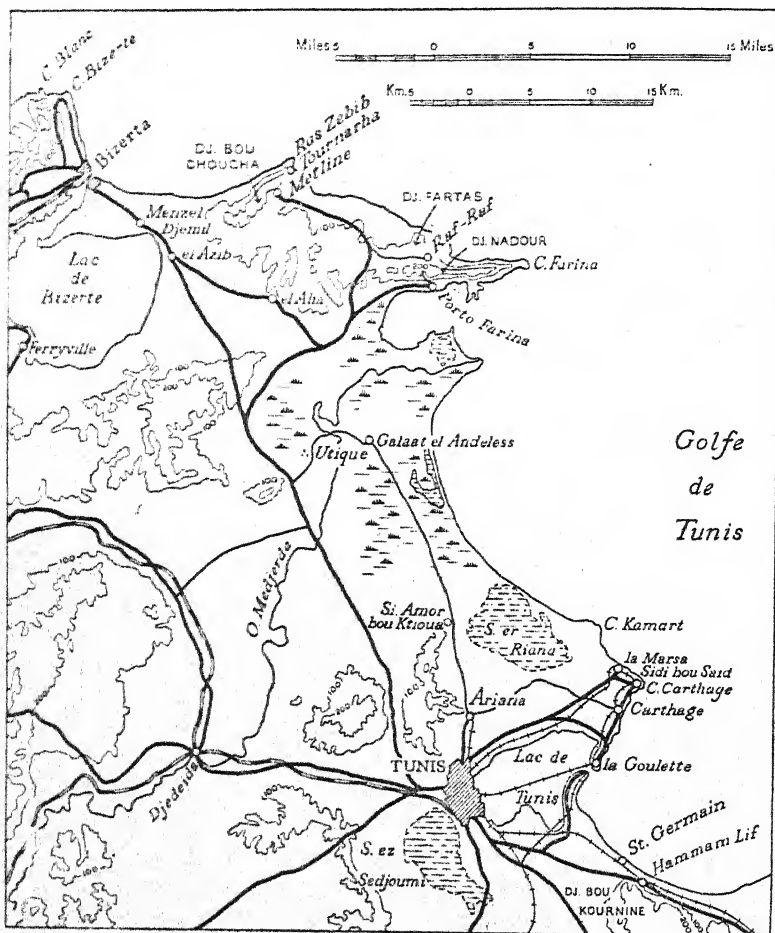


FIG. 14. *The coast: Bizerta to Tunis and la Goulette. Heights are in metres*

road. From Cap Bizerte to the port of Bizerta there is a good motor-road following the coast closely. Between Bizerta and Ras Zebib the main road runs on the inland side of the hill and dune country, and there are few tracks from the coast, but from Metline to Raf-Raf there is a good road with numerous tracks to the coast. A narrow road crosses Djebel Nadour to Porto Farina, which is

joined by another narrow road with Cap Farina. There is no road along the northern side of the Cap Farina peninsula.

Cap Farina-Cap Bon (100 miles) (Figs. 14, 15)

From Cap Farina to Cap Kamart (Camart), about 25 miles to the south-east, the coast makes a wide sweep, forming the western side of the Golfe de Tunis. It is very low and is backed by marshes. The Oued Medjerda reaches the sea about 7 miles south-south-westward of Cap Farina, forming a low delta fringed with shoal water, and this delta is continually extending eastward. At the head of the bay between Cap Farina and the mouth of the Oued Medjerda is the entrance to the Lac de Porto Farina, a shallow lagoon. The small town of Porto Farina lies on the northern shore of the lagoon (Photo. 58). From the mouth of the Oued Medjerda the coast curves south-eastward for 18 miles to Cap Kamart, and is flat and backed by marshes and lagoons, with a line of low hills behind. The beach is sandy and accessible, but there are no good exits. Cap Kamart is a reddish cliff about 65 feet high, with a very shallow lake, the Sebket er Riana (Sebkha er Rihana, Sebkha el Ruan), on its western side. Immediately south of the cape the cliffs are 300 feet high; then the coast becomes lower but rocky, trending south-eastward to the resort of la Marsa (el Marsa) (Photo. 60), which is connected by a good road with Tunis. Beyond la Marsa the coast rises to Cap Carthage and is unsuitable for landing. On the cape is the small village of Sidi bou Said and a lighthouse (Photo. 59). From Cap Carthage to la Goulette (Goletta) the coast trends south-westward past the site of ancient Carthage, near which is the modern town (Photos. 61-63): it is steep and rocky at first, and then becomes lower and sandy. There are villages and suburban settlements all the way along the coast to la Goulette, and landing is easy. The town of la Goulette (p. 244) is built on the tongue of sand which separates the Lac de Tunis from the sea (Photo. 64).

From la Goulette the coast curves south-eastward for about 12½ miles to the head of the Golfe de Tunis, and then makes a wide sweep north-eastward on the other side of the gulf to Cap Bon. South of la Goulette, on the southern side of the canal leading to Tunis, there is another low, sandy spit of land extending to the mouth of the Oued Miliane, about 2 miles southward. The coast continues low and sandy, with a narrow range of dunes behind it in places, and a fertile coastal plain between the shore and the hills of Djebel bou Kournine (Kernin) (Photo. 61). The villages of

St. Germain and Hammam Lif are on the coast, and there is good access inland. Djebel bou Kournine rises to a height of 1,887 feet behind Hammam Lif. Farther east the coastal region is marshy between the mouths of the Oued es Soltane and the Oued Bezirck. The well-cultivated Soliman plain with its many olive-groves lies behind the coast, separated from it by marshes and a lagoon. The Oued es Soltane lies west of the plain, and the Oued Bezirck is at the eastern end. From the mouth of this river the coast trends northward to form the western side of the Cap Bon peninsula. It changes in character and for 10 miles to Ras el Fortass (Cap Zafran) is rocky and very steep. Djebel Korbous (Gurbes) rises to 1,375 feet less than a mile inland (Photo. 65). Ras el Fortass is steep and rocky and has some ruins on its summit (350 ft.). From here the coast trends north-eastward for about 35 miles to Cap Bon (Ras Addar): behind the coast Djebel (Sidi) Abd er Rahman rises to 1,900 feet. There are cliffs along the coast at first for about $3\frac{1}{2}$ miles, and then a sandy beach extends for about 7 miles to Ras Degbi Marsa. Between Ras Degbi Marsa and Thonara bay, about 7 miles to the north-east, the coast is generally rocky with numerous small sandy beaches. Thonara bay itself is shallow, full of rocks, and unsuitable for landing; on an islet in its northern part a fishing settlement with two tall chimneys is connected to the mainland by a viaduct. Between this bay and Cap Bon, 7 miles farther north-eastward, the coast is rocky and indented with rocks off shore. There are several tunny-fishing settlements on this stretch of coast. There are marshy areas close to the coast, and a drainage canal runs from the Garaet el Haouaria (Garaet ech Cherif) to the northern end of Thonara bay.

Cap Bon is the north-eastern extremity of Tunisia and of the mountainous peninsula separating the Golfe de Tunis and the Golfe de Hammamet. There is a lighthouse on the cape and a signalling station on the summit of the hill dominating the cape.

The Île Zembra lies about 6 miles north-westward of Ras el Ahamar, off the western coast of the Cap Bon peninsula. It is 1,421 feet high and has rugged cliffs on its north-western sides. Towards the south-east the slopes are more gentle, and on the southern side is a small beach. The Île Zembretta is a small, flat-topped island with a lighthouse, about $3\frac{1}{2}$ miles north-north-westward of Ras el Ahamar.

Communications. Between Cap Farina and Cap Kamart there is no road immediately bordering the coast on account of the delta and marshes of the Oued Medjerda and of the lagoons bordering the coast. North of the Oued Medjerda the town of Porto Farina has

good road communications with both Bizerta and Tunis. The road follows the lake shore and then runs well inland to avoid the marshes. A narrow track connects Porto Farina with the fort on the extremity of Cap Farina. North of the entrance to the Lac de Porto Farina the only landing-place with tracks leading inland is a small part of the beach about $1\frac{1}{4}$ miles westward of the cape. These tracks link up with the road to Porto Farina. From Porto Farina to Tunis the main road runs parallel with the coastline and about 8 miles inland. On the landward side of the lagoons and marshes, and nearer to the sea than this main road, are narrow roads and tracks linking up the villages and connecting with the Bizerta-Tunis main road. The most important of these runs southward from Galaat el Andeless to Sidi Amor (Ahmeur) bou Ktioua, Ariana, and Tunis. Galaat el Andeless, about 3 miles from the coast, is the largest of numerous small villages in this lowland area. About 3 miles to the west is the ancient Phoenician settlement of Utique (Utica), once an important port (p. 33). From la Marsa, south of Cap Kamart, good roads lead to Tunis and along the coast to Carthage and la Goulette; these are easily accessible from the coast. Southward from la Goulette and Tunis there is a good network of roads. The main road to Hammamet and the Cap Bon peninsula and the railway to Hammamet approach the coast of the Golfe de Tunis close to Hammam Lif, and follow it closely for about 4 miles, before turning inland to Soliman to avoid the marshland near the mouths of the Oued es Soltane and the Oued Sfa.

The eastern side of the Golfe de Tunis has no good roads bordering it except near Korbous. A secondary road crosses the peninsula from Soliman to Cap Bon and is between 2 and 5 miles from the coast. Access to this road from the beaches is possible by narrow tracks. The most difficult stretch is between Ras el Fortass and Thonara bay, where sand-dunes border the coast.

EAST COAST (CAP BON-LIBYAN BOUNDARY) (Figs. 15-17)

From Cap Bon there are high cliffs bordered by rocks and backed by highland, but to the south these give way to a low coast with a fertile plain between it and the highland farther inland. Gradually this highland recedes until, in the south, the low-lying coast is backed by numerous extensive lagoons and bordered by shallow mud- and sand-banks, which make approach to the coast very difficult, except by shallow-draught vessels. Thus all the best harbours of Tunisia lie west of Cap Bon; those south of the cape

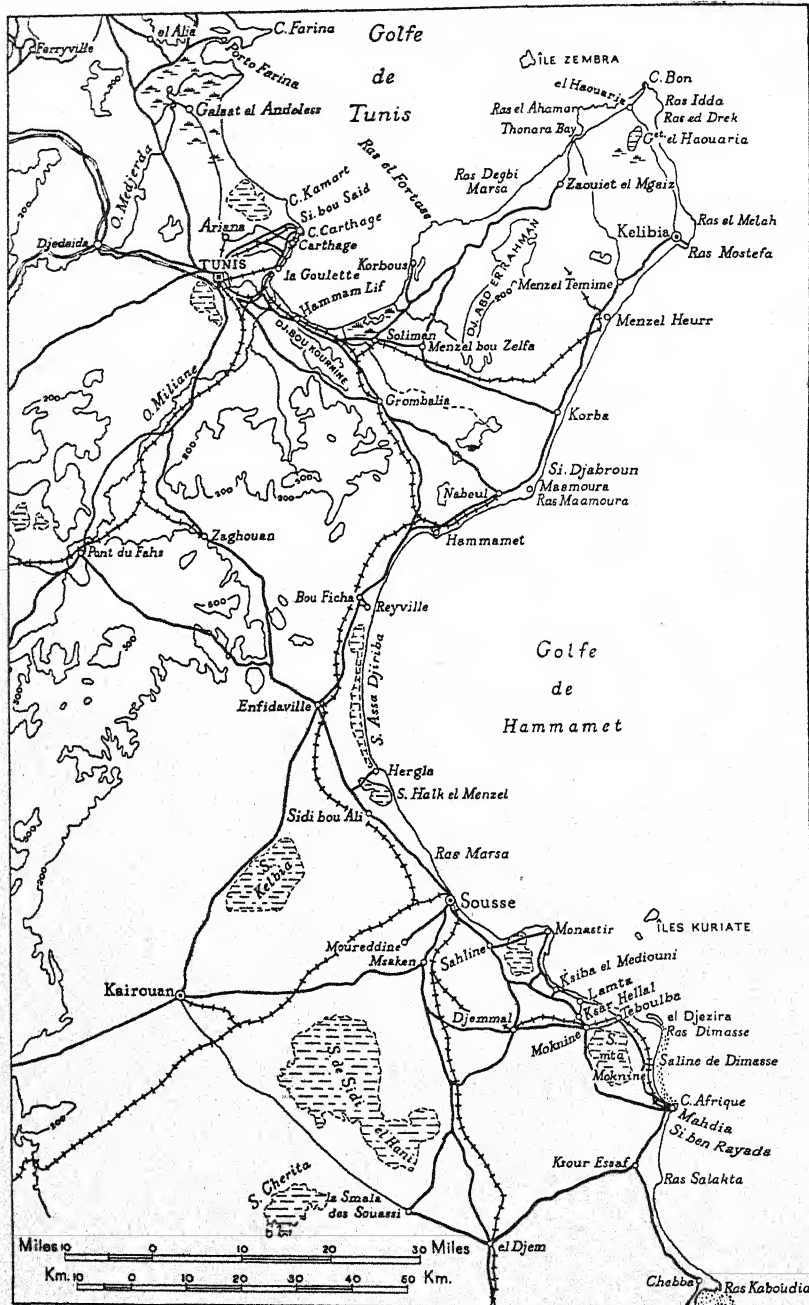


FIG. 15. The coast: Cap Farina to Ras Kaboudia. Heights are in metres

are not naturally good, and have to be dredged constantly, and the anchorage is often poor.

Cap Bon-Ras Maamoura (52 miles) (Fig. 15)

From Cap Bon the coast trends south-eastward for about $3\frac{1}{2}$ miles to Ras Idda (Iddah), one of three headlands which are close together, and throughout this stretch the coast is high, rocky, and inaccessible. Rocks and shoals project from the headlands, and the land rises steeply inland to a ridge of highland which runs parallel to the coast. From Ras Idda the coast trends south-south-eastward for about 15 miles to Ras el Melah (Ras el Mirh), and has stretches of cliffs alternating with sandy beaches. Behind the coast there is a chain of hills 400 to 500 feet high, and sand-dunes border the coast on either side of Ras el Melah. The point itself is low, with shoal water for half a mile to seaward. About $2\frac{1}{2}$ miles south-south-west of Ras el Melah is Ras Mostefa (Ras el Mustapha), which is dominated by a conspicuous hill on which is a large fort. Between these two headlands the coast is low and rocky, and there are the sunken remains of an ancient mole. The small town of Kelibia is about $1\frac{1}{2}$ miles inland, with Kelibia bay or road to the south-west of Ras Mostefa: this affords anchorage, but is sheltered only from west, north, and north-east winds. At the head of the bay is a beach, with rocks close inshore at its eastern end. There are also rocks close off the old custom house on the shore southward of Kelibia.

From the western end of Kelibia bay the coast trends south-south-westward for about 30 miles to Ras Maamoura. The beach is low and sandy, with many small lagoons and marshes bordering the coast. There are no dangers off shore, and the beach is backed by a plain extending to the foothills of Djebel (Sidi) Abd er Rahman.

Ras Maamoura (Mahmur) is low (33 ft.) and has on it the village of Maamoura (Marmora, Mahmur). Close inland is Sidi Djabroun (262 ft.), the shoulder of the most south-easterly of the foothills.

Communications. No communication is possible inland from the coast between Cap Bon and Ras Idda on account of the height of the cliffs. A narrow track runs along the coast from the mouth of a small stream about half a mile south of Ras Idda as far as the sand-dunes north of Ras el Melah, and several tracks lead inland to connect with the road that runs parallel with the east coast of the peninsula from el Haouaria (el Aouaria, Awaria) to Kelibia and Hammamet. Between Kelibia and Ras Maamoura there are numerous villages along the coastal plain: these are connected by a good road running from

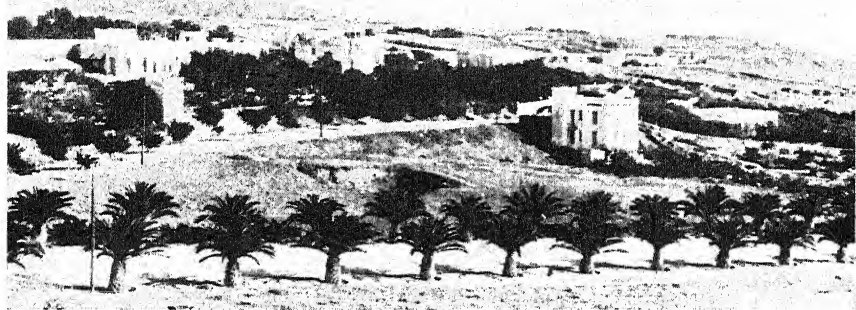
Kelibia southward to Hammamet roughly parallel to the coast, 1 or 2 miles inland at first but closer to the coast south of the village of Menzel Heurr (Heur). Tracks lead inland from the coast to this road. From the village of Korba, about 20 miles south-west of Kelibia, a branch road leads inland across the peninsula to Tunis. Access from the beach inland is generally difficult and restricted between Menzel Heurr and Ras Maamoura because of lagoons, which are, however, discontinuous and of no great size. The railway to Tunis through Soliman runs inland shortly after leaving Menzel Heurr.

Ras Maamoura-Monastir (70 miles) (Fig. 15)

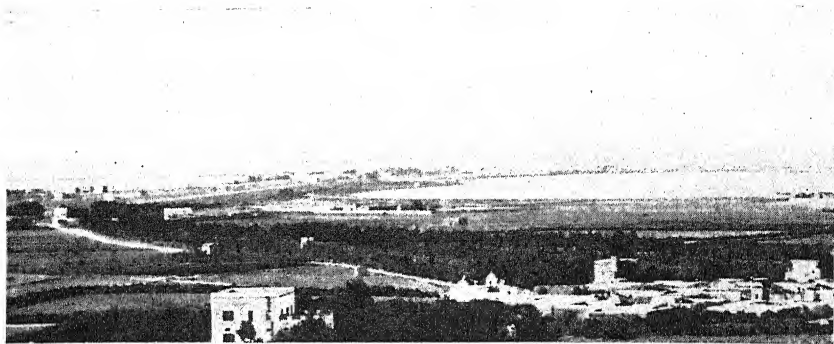
The Golfe de Hammamet lies between Ras Maamoura and the peninsula of Monastir, about 43 miles due south; its shores are sandy. Near its northern and southern ends stand the towns of Hammamet and Sousse. From Ras Maamoura to Hammamet the coast trends south-westward for about 10 miles, and there is a narrow plain with highland rising to over 900 feet 1 or 2 miles from the coast, and increasing in height farther inland. Hammamet is built on a low, sandy promontory and is backed by numerous houses and cultivated land (Photo. 67). Anchorage, sheltered from northerly and north-westerly winds, can be obtained off Hammamet, though the holding ground is only moderately good. Small vessels can anchor close inshore, and larger vessels about 1 mile off shore. There are no jetties, but landing is possible on the beach under the western walls of the town. From Hammamet to Hergla (Herkla), about 30 miles to the south, the beach is sandy. Lagoons lie close to the coast between Bou Ficha (Bu Fisha) and a point about 4 miles south of Hergla. Hergla is a small settlement with a hill about 100 feet high behind it. Near the village the shore is rocky, but farther south it is again sandy. The shore trends south-south-eastward for about 15 miles from Hergla to Sousse (Susa) (p. 255). For most of the way it is backed by dunes, but in the last 5 or 6 miles from about Ras Marsa to Sousse the coast is fringed by rocky shoals, extending seaward for about half a mile. Southward of Sousse these same characteristics are seen, the shoals extending, in places, as far as 1 mile off shore. In the neighbourhood of Sousse the beach is backed by extensive undulating plains which are well cultivated. South of the port, marshy land borders the coast and an extensive lagoon, the Sebkhah Ain Sahline, lies between the peninsula of Monastir and the mainland. It has a shallow entrance about 7 miles



62. *Carthage from the old port*



63. *Carthage*



64. *La Goulette: outskirts of Carthage in foreground*



65. *Korbous, Cap Bon peninsula*

south-east of Sousse, and on the western side of this entrance the shore is backed by sand-dunes and marshland, forming a district known as ed Dekhila. Sand-dunes continue along the beach north-east of the entrance, 1 mile from which was the ancient port of Ruspina. From here the north coast of the peninsula becomes rocky and there are rugged cliffs on top of which, at the eastern end, is a large shrine or koubba (Photo. 66). The town of Monastir (p. 260) is at the north-eastern end of the peninsula. About a quarter of a mile from the shore are three small islands, of which the largest, Djeziret Sidi el Ghedamsi, has a koubba and a tunny fishery on it.

The Îles Kuriate are two islands to the east of the Monastir peninsula. Kuriate, the larger, is about 9 miles from Monastir and is low, except in the centre, where there is a hillock with a lighthouse. On its western side is a small breakwater sheltering a wooden landing pier. El Shrir (Conigliera), about $1\frac{1}{2}$ miles south-south-westward of Kuriate, is 20 feet high: on it are some clumps of vegetation and a tunny fishery.

Communications. The main road from Nabeul and Hammamet to Sousse and Monastir runs round the coast of the Golfe de Hammamet, at first very close to it and then, south of Bou Fichta, farther inland to avoid the lagoons. The railway follows the general line of the road as far as Sousse, where it turns inland. Between Nabeul, a small town about 3 miles south-west of Ras Maamoura, and Hammamet road and railway are very close to the beach; the railway then crosses to the inland side of the road. Two roads lead from the beach into Nabeul. Between Hammamet and Bou Fichta there is easy access to the main road, but between Bou Fichta and Hergla there is no coastal road because of the lagoons; the main road runs on the inland side of the Sebket Assa Djiriba to Enfidaville and Sidi bou Ali before reaching Sousse. This lagoon, with its connexions, is nearly 20 miles long and in places 1 mile wide. It is the largest on this stretch of the coast and is impassable to motor transport. From Hergla to Sousse a road runs parallel with the coast and another good road leads inland from Hergla, crossing the Sebket Halk el Menzel at a narrow part. South of this lagoon the land rises again, and between here and Sousse numerous roads pass inland to the main road from Enfidaville to Sousse. Between Sousse and Monastir there is a good main road, at first close to the coast and easily accessible from it, then running farther inland to Sahline to avoid the marshes and dunes of ed Dekhila. It crosses the northern end of the Sebkhah Ain Sahline to the fertile

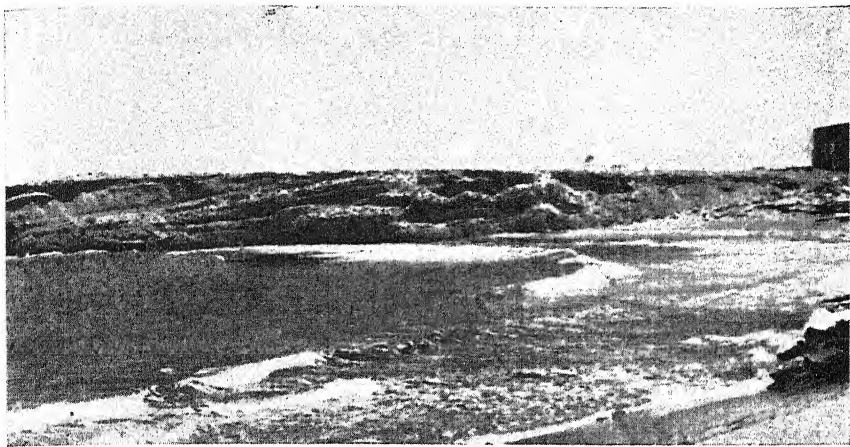
plain of Monastir. A very narrow track runs along the beach between Sousse and the entrance to the Sebkha Ain Sahline, where it joins the main road.

Monastir-Ras Kaboudia (54 miles) (Fig. 15)

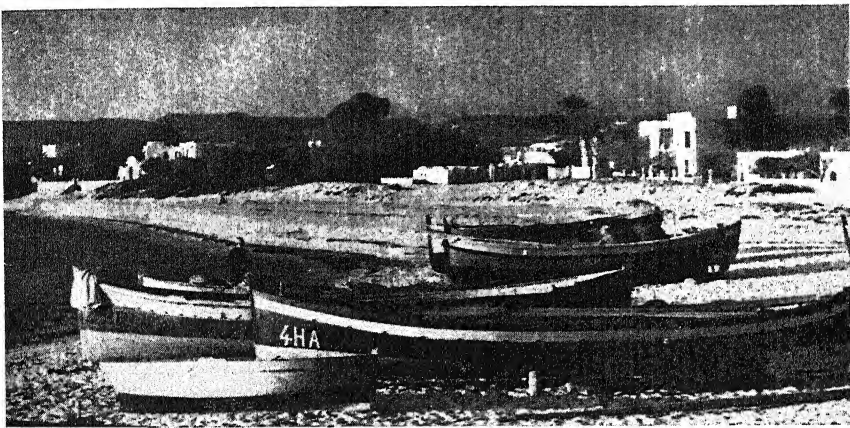
The Golfe de Monastir lies between the peninsula of Monastir and a point about 4 miles west of Ras Dimasse (Dimas). From this point a shallow spit extends to the Îles Kuriate and limits the bay on the eastern side. The coastal waters of the bay are very shallow, with much seaweed along the shore. The eastern side of the Monastir peninsula slopes gently to the sea except for a short stretch of rocky and indented coast immediately south-east of the town. About half a mile farther south is Bordj (Burj) el Kelb at the northern end of an extensive beach of mud and sand: the pier of Monastir, where landing is possible, is a short distance south of Bordj el Kelb (p. 262). The Monastir peninsula is well cultivated with olive-groves between the coast and the Sebkha Ain Sahline, and the coastal region around the bay is similar. The bay affords the best refuge between Cap Bon and Ras Kaboudia. Although it is exposed to winds from north and north-east, the masses of seaweed which fringe the shores and islands deaden the sea and render anchorage in depths of less than 33 feet quite secure; farther into the bay it is even safer. The head of the bay is very shallow, and off the villages of Ksiba el Mediouni (Xiebah, Sieba) and Lamta (Lemta, anc. Leptis Minor) the depths are less than 6 feet at a distance of 1 mile off shore. There is a deeper portion off the shore between Saida (Saidah) and Teboulba, where anchorage is secure in all winds. There are many roads leading inland, and the whole region is well cultivated, particularly with olives.

From Teboulba the coast continues for 4 miles east-south-eastward to Ras Dimasse, which is low and fringed with shoals for about three-quarters of a mile off shore. Just to the north, on the edge of the spit extending to the Îles Kuriate, is a narrow island, el Djezira (Thapsus island). Between it and the coast is a shallow lagoon. On Ras Dimasse are the ruins of the Phoenician settlement of Thapsus. The coast runs southward from Ras Dimasse for about 8 miles to Cap Afrique (Cape Africa, Ras Mahdia) and is low, sandy, and backed by hills and olive-groves. The hills behind the coast separate it from a large salt lake, the Sebkha Mta Moknine.

Ras Mahdia is a small peninsula fringed with rocks and shoals: its rocky extremity is Cap Afrique. The town of Mahdia (p. 262) stands on the peninsula, its white buildings, dominated by the citadel, being



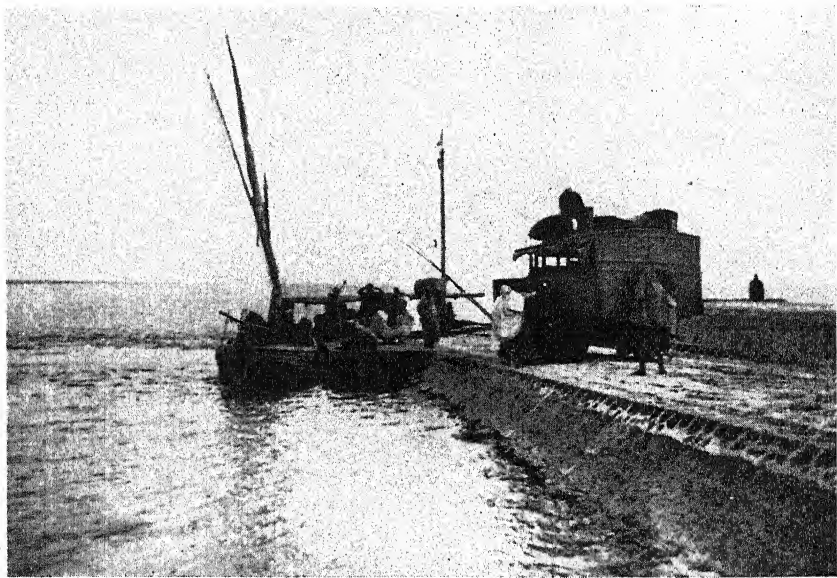
66. *Coast at Monastir*



67. *Hammamet*



68. *Îles Kerkenna: low cliffs of the Île Chergui*



69. *Djorf-Adjim ferry*

conspicuous from seaward. There is a small harbour on the southern side of the peninsula, from which a sandy beach runs southward, broken only by a rocky cliff, surmounted by Sidi ben Rayada (Gheuada), about $1\frac{1}{2}$ miles from the harbour. Behind this beach lies a small lagoon, Sebkha Mta Sidi ben Rayada (Gheuada), which prevents landing. Anchorage is possible either north or south of Mahdia, but the latter is more sheltered. From Cap Afrique to Ras Salakta, about 8 miles to the south, the coast rises, the beach giving way to vertical, rocky cliffs ending at Ras Salakta, which is fringed with rocks for a short distance. Ksour Essaf (Ksursef) (p. 216) is a small town about 3 miles inland from Ras Salakta. A ridge of low hills runs between the town and the headland. From Ras Salakta the coast trends south-south-eastward for about 12 miles to Ras Kaboudia (Kapudia). It consists for the most part of low sandstone hills covered with sand, and rocks alternate with sandy beaches. Farther south towards Ras Kaboudia the coast is backed by extensive dunes.

About 2 miles north-westward of Ras Kaboudia is Sidi Abdallah and about 1 mile to the south-west of Sidi Abdallah is the village of Chebba. Ras Kaboudia consists of a rocky plateau ending in a small peninsula fringed with shoals and islets. On its north-eastern extremity stands Khedidja (Kredidja) tower, 92 feet in height, and on the southern side are the buildings of a tunny fishery. Numerous tracks lead into Chebba.

Communications. Between Monastir and Ras Kaboudia the main road is never far from the coast, and there are many roads leading inland. The railway from Sousse to Mahdia approaches the coast at Teboulba, and then follows the main road to Mahdia. Around Ras Dimasse access inland is difficult because of shallow lagoons. About 4 miles south of Ras Dimasse a road runs down to the beach to a small salt-working. Farther south road and railway run close to the beach, and landing and access are easy. The main road from Mahdia to Chebba passes between the Sebkha Mta Sidi ben Rayada and the coast and then turns inland to Ksour Essaf. A narrow road skirts the coast to Ras Salakta, and from here to Ras Kaboudia the main road is again close to the coast and numerous tracks lead to it from the beach.

Ras Kaboudia-Ras Yonga (88 miles) (Fig. 16)

Between Ras Kaboudia and Ras Bourmada (Burmada, Bou Rmada), about 72 miles south-westward, the coast is bordered by banks of sand, mud, and weed. These are known as the Kerkenna banks and

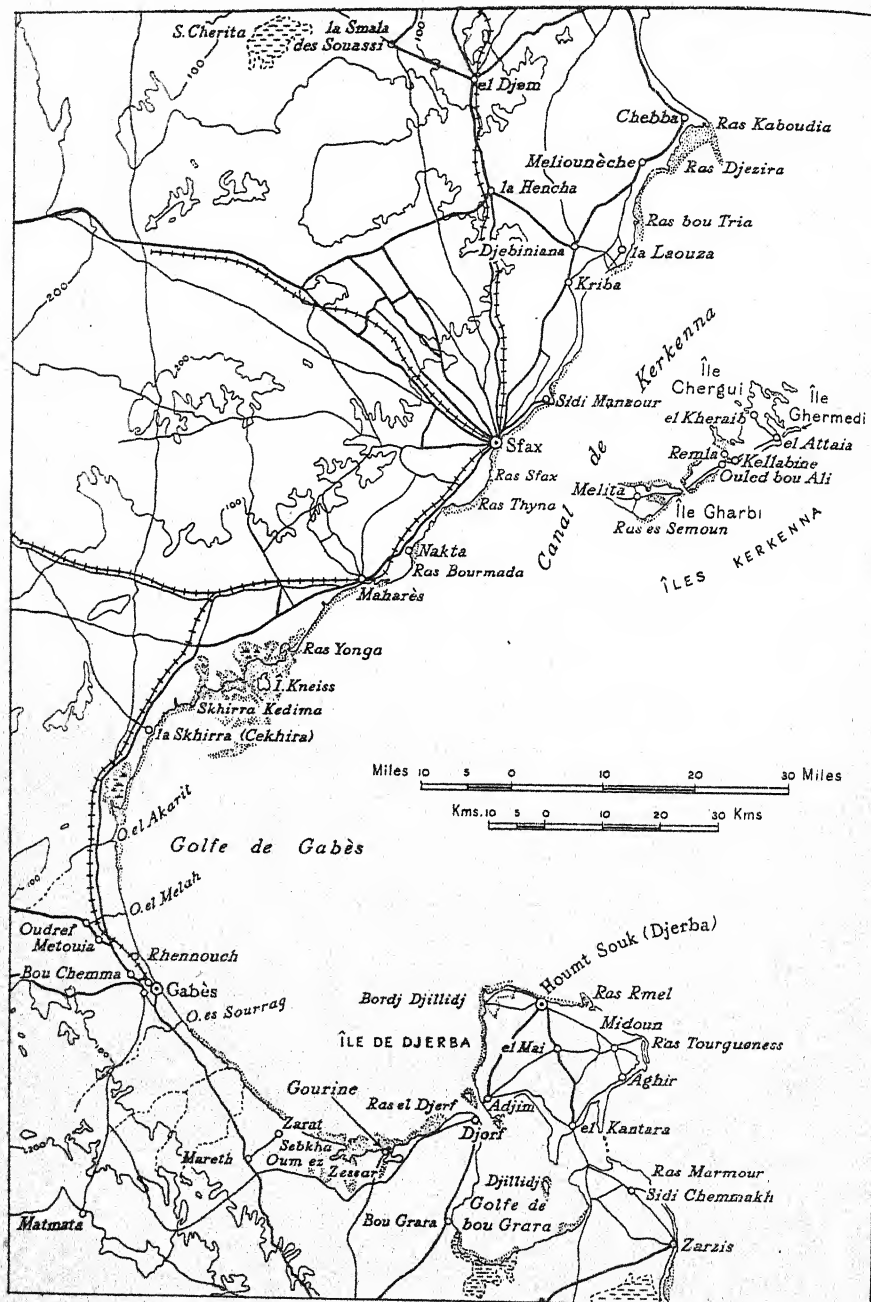


FIG. 16. The coast: Ras Kaboudia to Ras Marmour. Heights are in metres

extend seaward for about 35 miles. They are separated from the mainland by the Canal de Kerkenna (Kerkenna channel), and at the south-western end of the banks are the Îles Kerkenna and several islets. The shallower parts of the banks are intersected by numerous steep-sided channels, some of which are comparatively deep; the seaward edges of the whole area are fringed with shoal water. Navigation in this area is very complicated, and the Canal de Kerkenna, lying between a low coast fringed with shoals and devoid of landmarks on the one hand and the Kerkenna banks on the other, is available only to vessels drawing less than 10 feet. The whole of this coast is important for its fisheries. Between Ras Kaboudia and Sfax the coast is very low, rarely more than 20 or 30 feet above sea-level, and usually only about 10 feet. The water is very shallow off shore, sometimes up to a distance of 8 miles. There is some cultivation of the coastal strip, particularly south of Ras bou Tria, where there are many more villages near the coast. Nearer to Sfax the beach is sandy. The coast between Sfax and Ras Bourmada is again low with shallow water off shore, the 1-fathom line lying at a distance of about 1 mile in places. The port of Sfax (p. 266) is situated midway between Sidi Mansour and Ras Thyna (Tina), and inland of the town a plain extends to the foot of a ridge of hills about 500 feet high, 9 miles from the coast. The roadstead off Sfax is very well sheltered. The coast between Ras Bourmada and Ras Yonga (Ungha) is again low, with shallow water off shore. Near to Ras Yonga it becomes marshy and is unsuitable for landing. Inland from the coast there is much cultivation. Maharès is a small town $2\frac{1}{2}$ miles south-westward of Ras Bourmada.

The Îles Kerkenna are a group of islands to the east of Sfax at the south-western end of the Kerkenna banks. The Île Chergui, the largest island, is divided at spring tides into three parts by shallow lagoons: the north-eastern part is barren and uninhabited; the centre is low-lying and has on it the villages of el Kheraib and el Attaia; most of the villages, such as Remla, Kellabine, and Ouled bou Ali, are in the south-western and highest part. The coasts are everywhere low except near Ouled Yaneg (Uled Yanek) to the south-west of Ouled bou Ali, where there are some low cliffs of clay (Photo. 68). The Île Gharbi, on which is the village of Melita, is the south-westernmost island of the group.

Communications. The main road from Chebba to Sfax runs more or less parallel to the coast about 3 or 4 miles inland. Access to this road from the coast is generally easy across cultivated land. There is

a dense network of roads round Sfax. The main road southward to Maharrès and Gabès again runs close to the coast. From Maharrès it turns farther inland to avoid the marshy country. There is no railway line close to the coast between Ras Kaboudia and Sfax; south of Sfax the line follows the road to Maharrès, where it turns inland.

Ras Yonga-Ras Marmour (146 miles) (Fig. 16)

The Golfe de Gabès extends from Ras Yonga to the Île de Djerba, about 40 miles to the south-east. Its shores are low but are backed in the south by hills rising to the Monts des Ksour. At the head of the gulf is the port of Gabès. In the northern part between Ras Yonga and Skhirra Kedima (Kedime peninsula), a small projection 11 miles south-westward in a direct line, the marshy coast is bordered by a drying bank of mud and weed which extends about 6 miles off shore in places and is covered with fishing-stakes. On the eastern part of this bank are the Sur Kenis islets, the largest of which is the Île Kneiss. Between this bank and the coast southward of la Skhirra is Sur Kenis bay, the western shore of which consists of rugged cliffs of red clay intersected by deep ravines. About the middle of the western shore is the village of la Skhirra (Cekhira), a small settlement connected to the main road by a secondary road. The bay affords excellent sheltered anchorage at all times, but there are no landing-places. South of la Skhirra the coast becomes low again and is fringed with drying banks of mud to a distance of about 1 mile. There are numerous marshes and lagoons bordering the coast, and the road and railway run on the landward side of these.

About 12 miles south of la Skhirra the Oued el Akarit (Wadi Akarit) enters the Golfe de Gabès, and on either side of its mouth there are low cliffs. Immediately south of this ravine there is marshy ground, and then the coast rises again. About 8 miles south of the Oued el Akarit is the Oued el Melah. Between the latter stream and the port of Gabès there are four oases, all visible from the sea and within about 4 miles of the coast. They are Oudref (Udref), about 4 miles inland from the mouth of the Oued el Melah; Metouia (M'Tuia), 2 miles south-east of Oudref; Rhennouch, very close to the coast, nearly 5 miles south of the Oued el Melah; and Bou Chemma, about $1\frac{1}{2}$ miles north-west of Gabès. The town of Gabès (Qabes) (p. 272) is about 27 miles south of la Skhirra on the southern side of a conspicuous oasis. The coast near the oasis is fringed by a sandbank with depths over it of less than 18 feet, to a distance of nearly 1 mile in places. A harbour has been dredged at Gabès at the mouth of the Oued

Gabès. Landing is possible at Gabès, but communication with the shore may be difficult in summer owing to the surf at the harbour entrance.

The coast south of Gabès is at first low and flat, and is then bordered by dunes as far as the mouth of the Oued es Sourrag (Srag), about 4 miles south-east of Gabès. There are shoals off the mouth of this river. Farther south the coast rises slightly and is backed by low hills at a short distance inland. The coast is similar in character as far as the extensive marsh of the Sebkha Oum ez Zessar (Sebkha Mezessar), about 30 miles south-east of Gabès. Numerous streams cross the coastal plain, and there is a coastal bank with shallow water most of the way. There are several small oases along the main road which runs farther inland to the large oasis and village of Mareth, some 7 miles inland. East of the Sebkha the coast gradually rises again to Ras el Djerf (Tarf el Jorf), about 17 miles east-north-eastward. This part of the coast is fringed with drying banks and shoals up to a distance of $2\frac{1}{2}$ miles in places. Ras el Djerf consists of cliffs of red clay from 50 to 60 feet high. Between this headland and the Île de Djerba is the Adjim (Ajim) channel, a deep skirting Ras el Djerf.

The Golfe de bou Grara (Bahiret el bou Grara) is a wide bay, full of banks and shoals and with a coastline of about 40 miles, lying between the Île de Djerba and the mainland. It is approached by narrow channels at either end, but affords good anchorage to vessels able to penetrate it. Its depth varies from 15 to 60 feet, its deepest parts being in the centre. The western entrance is the Adjim channel, between the south-western end of the Île de Djerba and the headland of Ras el Djerf on the mainland. It consists of a deep which skirts Ras el Djerf but is barred by shoals at either end. There are two passages giving access from the Golfe de Gabès to the deep and allowing the passage of vessels drawing from 10 to 12 feet of water. The eastern entrance to the Golfe de bou Grara is very shallow and is barred by the ruins of an ancient (probably Roman) causeway which crosses it in a south-south-easterly direction from el Kantara on the island to el Kantara on the mainland. At both of these there are small fishing-harbours. Near the edge of the gulf the water is much shallower. The south and east shores are low, marshy on the south, but cultivated on the east. The western shore, where the settlement of Bou Grara stands on the site of the Roman town of Gigthis, is higher. Ras Marmour (Marmor, Marmora) is about 7 miles east of el Kantara on the mainland.

The Île de Djerba is separated from the mainland by the Golfe de bou Grara. It has an area of about 250 square miles and is generally low and very well cultivated. It rises to higher land in the centre, reaching about 150 feet: these hills have cliffs on the southern side. The coastline of the island is about 65 miles long. The western coast is fringed in places with rocky patches, and a shallow bank of mud and weed extends northward for a distance of from 2 to 3 miles between Bordj Djillidj (Jilij), the north-western extremity of the island, and Ras Rmel (Remoel), about 12 miles farther east. On this northern coast is the settlement of Houmt Souk (Houmt Suk) or Djerba (p. 275), a small port and the administrative centre of the island. It is noted for its sponge and tunny fisheries. From Ras Rmel to Ras Tourgueness (Taguerness) the coast trends south-eastward for 8 miles, and there are shoals off Ras Tourgueness and along the greater part of the remainder of the east coast. Landing is very difficult all round the island, and at Houmt Souk passengers have to be landed in small boats, the anchorage being very shallow for some distance off the coast. A channel, 5 feet deep, has been dredged and marked by buoys across the flats on the north side of the island to a small basin at Houmt Souk, which is dredged to a depth of 7 feet. The Djerba roadstead is off the edge of the bank, and anchorage is good. Anchorage is possible anywhere off the west coast and also off Aghir, about 5 miles south-south-west of Ras Tourgueness.

Communications. The main road from Sfax to Gabès continues to run close to the coast throughout this section, as does the railway except between Maharès and la Skhirra where it turns inland. Access to the road and railway from the coast is generally over low country, but there are few good roads, narrow tracks being most common. Good roads lead inland from Gabès to all main centres, and an excellent road continues southward to Mareth and Médenine. About 2 miles south of Mareth a narrow road leaves this main road and leads eastward to Djorf, opposite the Île de Djerba. A narrow track runs close to the coast from Gabès round the gulf through Gourine to Djorf. Numerous tracks lead inland from the coast to these roads, particularly between Gabès and the Sebkhâ Oum ez Zessar. The road from Djorf to Médenine follows the western shore of the Golfe de bou Grara to Bou Grara and then runs inland. The southern and eastern coasts of the gulf are connected with the interior only by narrow tracks.

There are good roads over the Île de Djerba connecting all the

villages; except between Bordj Djillidj and Houmt Souk, and along the eastern and southern coasts, they are not close to the coast, but access inland is generally easy. There is a ferry service from Adjim on the island to Djorf on the mainland (Photo. 69).

Ras Marmour-Libyan Boundary (55 miles) (Fig. 17)

From Ras Marmour to the small port of Zarzis (p. 277), 10 miles distant, the coast runs south-south-eastward and is backed by a line

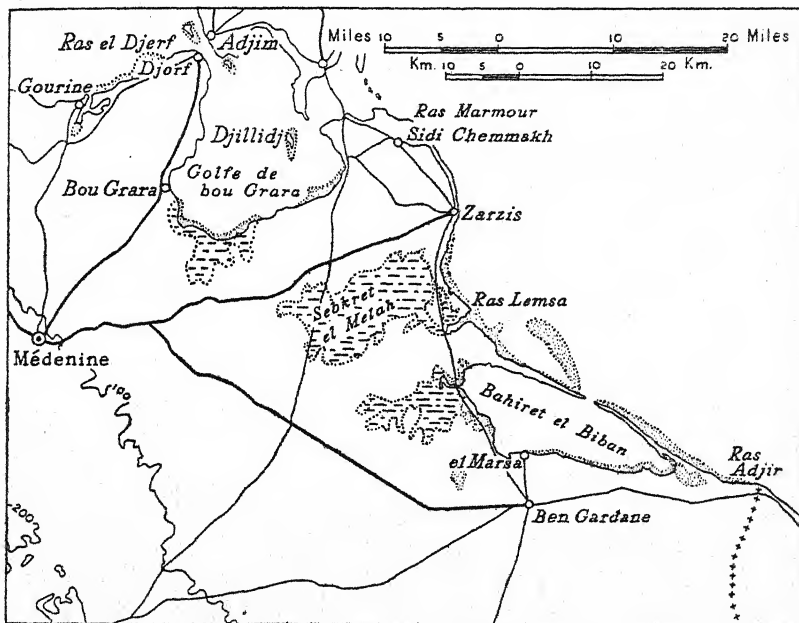


FIG. 17. *The coast: Ras Marmour to Libyan boundary.*
Heights are in metres

of low hills which end in cliffs. This coast is fringed with rocks, and a shallow bank extends for about 1 mile off shore.

The coast is low from Zarzis to the Libyan boundary, some 45 miles south-eastward, and is backed by extensive lagoons. Off the coast sand and weed form a large bank extending for about 12 miles off shore. The depths over this bank are less than 60 feet and there are numerous shoals on it. From Zarzis the coast first trends southward and then south-eastward to Ras Lemsah (Ras el Lemo) on the north side of the entrance to the Sebket el Melah, Ras Adjir (Ashdir), and beyond. The largest of the lagoons is the Bahiret el Biban, the narrow

entrance of which is about 12 miles south-east of Ras Lemsa. The entrance is very shallow, there being a bar with a depth over it of only 3 feet, but the water in the lagoon reaches a depth of 18 feet. The fishing-harbour of el Marsa (Marsa Ksiba) is at the head of the lagoon. Between the entrance and Ras Adjir is a chain of very low sandhills, many of them surmounted by ruins. Ras Adjir, on the boundary between Tunisia and Libya, is a conspicuous point, surmounted by a masonry pyramid, 39 feet high, with a white spherical topmark.

Communications. There are few roads near the coast in this section, particularly south of Zarzis. Narrow roads connect el Kantara opposite the Île de Djerba with Sidi Chemmakh, 3 miles inland from Ras Marmour, and Zarzis, and a good road runs westward from Zarzis to Médenine. Another road runs northward along the coast from Zarzis to Sidi Chemmakh. South of Zarzis the main road runs parallel to the coast across the entrance to the Sebkret el Melah and then inland to Ben Gardane, an important oasis and route centre about 5 miles from the southern shore of the Bahiret el Biban, to which it is connected by road. From Ben Gardane a road runs eastward towards the coast and is only about 1 mile from the coast at Ras Adjir, beyond which it continues into Libya. There is only a narrow track along the spit of land separating the Bahiret el Biban from the sea.

CHAPTER IV

CLIMATE

TUNISIA can be divided into three climatic regions, corresponding approximately to the threefold physical division made in Chapter II (p. 14): the north, the centre, and the south. The northern region, which includes the north coast and the Mediterranean slopes of the adjacent mountains, has a temperate climate with a moderate rainfall. The central region, lying between eastern Algeria and the east coast of Tunisia as far south as about latitude 34° N., has a much larger diurnal and annual range of temperature than the north coast: rainfall decreases rapidly from north to south. The southern region, which includes a part of the Sahara, is desert, with a great range of temperature and scanty irregular rainfall.

Four seasons may be recognized in most areas. Winter (December to March) is the principal rainy season, when temperatures are moderate. In spring (April and May) the temperature increases rapidly, but the rains become light and irregular. The summer (June to September) is hot and rainless everywhere. Autumn (October and November) is warm, though considerably cooler than summer; the rainy season begins towards the end of September.

In this chapter rainfall figures are given in inches and temperatures in degrees Fahrenheit. The tables to which reference is made are in Appendix B. Fig. 18 gives the location of the meteorological stations of Tunisia and of other places mentioned in this chapter and in Appendix B.

Pressure and Winds (Fig. 19; Tables I-III)

The seasonal variations of Tunisia are associated with the different pressure systems affecting north Africa throughout the year. In winter the Sahara is colder than the Mediterranean and forms a centre of high pressure. The Mediterranean meanwhile forms a low-pressure centre, which is constantly changing its position and intensity. In summer, conditions are reversed, the desert being warmer than the sea, so that low pressure occurs over the Sahara and high pressure over the Mediterranean. Conditions in Tunisia are also influenced, to some extent, by the constant high pressures over the Azores, which are most marked in summer when they lie farthest north.

The prevailing winds, which depend upon the pressure distribution, also change with the seasons. In winter (October to April)

westerly winds, particularly those from west and north-west, prevail in most parts of Tunisia and bring rain: in the extreme south, north winds are more common. In summer (May to September) the winds

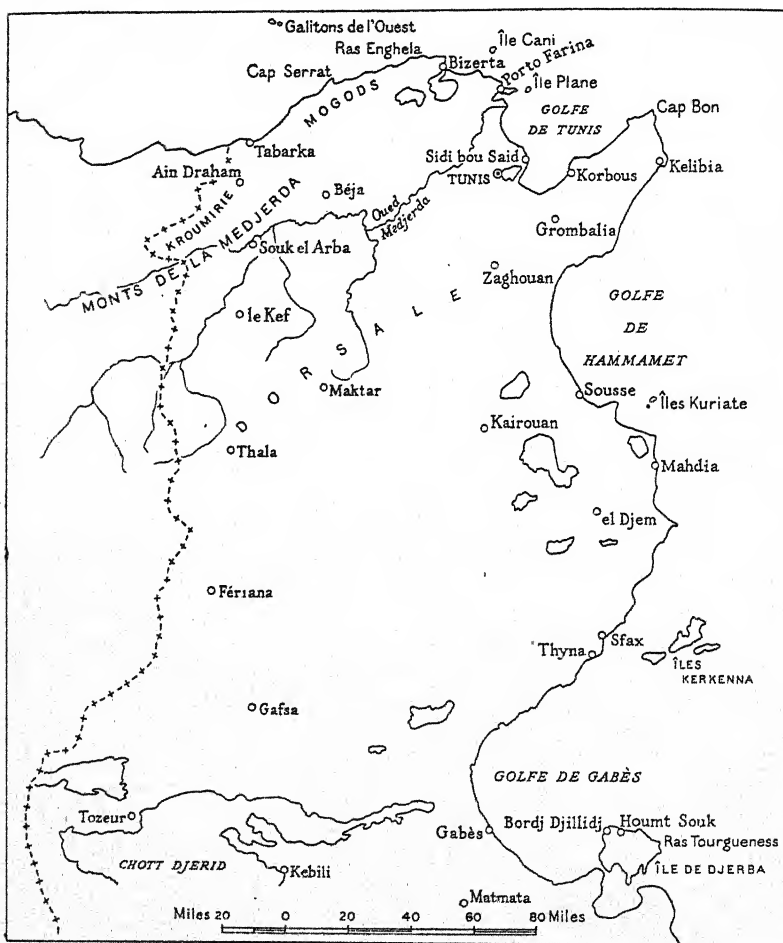


FIG. 18. Key to location of places mentioned in Chapter IV

blow towards the Saharan low pressures, usually from north-east or east. Towards the south these winds become increasingly strong and dry, and both rain and cloud are rare. The relative humidity of the atmosphere throughout the summer is very low, and there is no rainfall except in a few, violent storms.

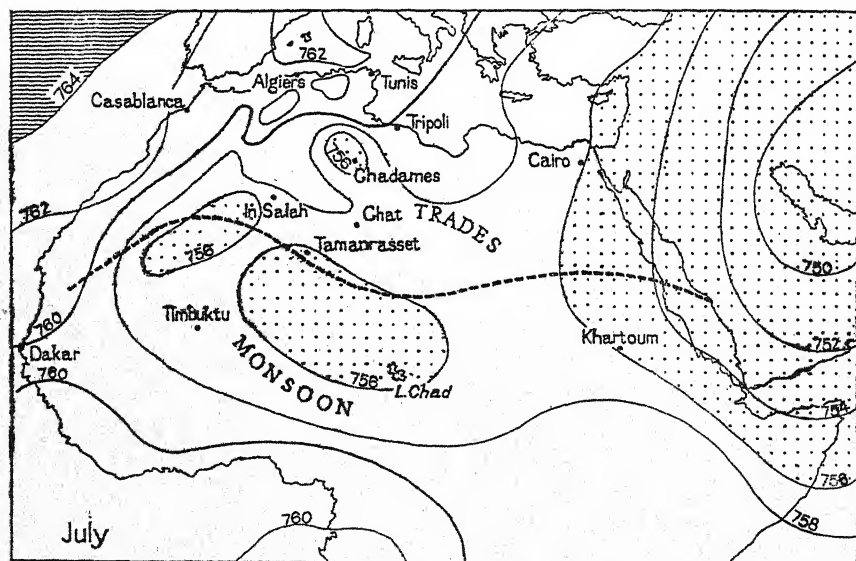
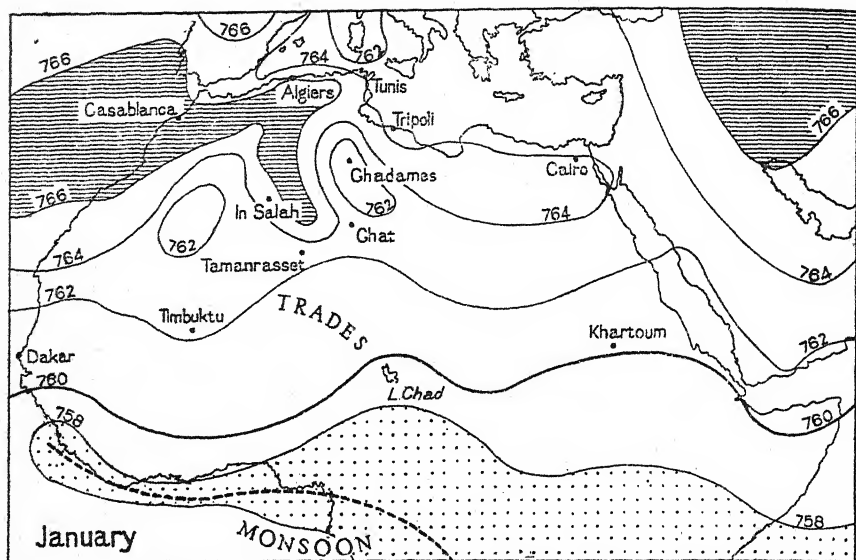
Seasonal contrasts of climate are, therefore, marked in Tunisia as

elsewhere in north Africa. The winter climate resembles that of Europe, but the dry heat of summer gives conditions similar to those of the Sahara. The winds are seldom as regular as those of the trade-wind belt of the desert, however, and often change considerably within short distances. It is largely because of this that rainfall figures vary so much both from year to year and from place to place.

Apart from the winds already mentioned, the outstanding wind is the sirocco (scirocco), an excessively hot, dry, and dusty wind from the desert, which blows during the hot season, and occasionally at other times of the year. It is sometimes known as the *chihili* (*chili*) or as the *guebli*, or south wind, but may be from any direction between south-east and south-west through south; not all southerly winds, however, nor even all southerly warm winds, are sirocco. The true sirocco has a temperature far above the normal for the season, sometimes more than 110° , with very low relative humidity of 20 to 30 per cent. or less. The intensity of evaporation, especially in summer, sometimes causes vegetation to wither and turn black within a few hours, and the abnormal heat, dryness, and dustiness of the sirocco have a very enervating effect upon the human body. Winter and spring siroccos also affect health because of the accompanying extremes of temperature.

The sirocco originates over the hot Sahara, but it owes its excessively high temperature (as in the case of the warm *föhn* winds of Switzerland) to the warming of the air as it descends the northern slopes of the mountains of Tunisia; as a result the temperatures of the north are sometimes considerably higher than those of the south. The sirocco is seldom general over the whole coastal region at one time, and is sometimes very local. Its duration also varies greatly. When it appears in the morning it may continue all day, and even occasionally overnight; usually, however, it lasts only a few hours, is felt most strongly about 1400 hours, and ceases at sunset. Sometimes the wind recurs on several days in succession (up to six), often at the same time of day.

Statements regarding the frequency of siroccos vary greatly from place to place and according to whether the definition of sirocco includes all, or only some, of the southerly winds recorded. For this reason care must be taken in using the figures given in Table II. In general it may be said that the sirocco is most frequent in summer and least in winter, with spring and autumn intermediate and about equal to one another. East of a line joining Tunis to Gafsa and the



Miles 500 250 0 500 1000 1500 2000 2500 Miles



Highest pressure  Limit of the trade winds
 Lowest pressure  and the monsoon - - - - -

FIG. 19. Pressure distribution over northern Africa in January and July

western end of the Chott Djerid the sirocco blows on 30 or 40 days in the year: west of the line the average is between 20 and 30, and less than 20 in the Tabarka coastal district.

Local Winds. The chief of the local winds, if the sirocco be excluded from this class, are the land and sea breezes which are well marked along the Tunisian coast during the warm season. The sea breeze, the more prominent, begins during the morning, increases to a maximum at about 1400 hours, and disappears about sunset. Often it gradually veers from morning to afternoon. These breezes generally range from about 10 miles seaward to 10 miles inland, increasing at times to about 20 miles in both directions, and the normal limit of height is about 3,000 feet. The land breeze is usually less marked and is often absent, there being no wind at night.

Gales and Strong Winds (Table III). Gales are relatively few, though winds falling somewhat short of gale force (forces 6-7) are much more numerous. In the Golfe de Tunis the strong winds of winter and summer are for the most part from the north-west. Rough seas occur on about 100 days a year and are sometimes dangerous. Along the east coast, north-west winds are the predominant strong winds in winter: during the other seasons the strong winds are from the north-east and north.

During the winter of 1902 a hurricane at Porto Farina drove a bark moored at the lakeside ashore and into a field. In October 1922 a tornado lasting fifteen minutes at Bizerta destroyed hundreds of olive-trees and removed the roofs of many houses.

Temperature (Fig. 20; Tables IV, V)

Differences of temperature as well as of rainfall distinguish the seasons in Tunisia, but mean annual temperatures throughout the country are broadly similar. There is a general increase from north (e.g. Bizerta 65°) to south (e.g. Gabès 67°), and from the coast inland except for the highland area in the north-west. The mean daily range of temperature during the year is 12° or 14° on the north coast, but elsewhere is rather larger, especially where the mean annual temperatures are greater.

Temperatures often vary considerably within short distances, owing to the proximity of the sea and of the desert, and to the effects of altitude and exposure. In general the sea has a much greater influence upon temperature than latitude: it warms the coastal districts in winter and cools them in summer. Inland, however, continental conditions soon appear, and there are marked diurnal and seasonal

changes. These characteristics are obvious even in areas near the sea, but separated from it by uplands, for example, the Medjerda valley.

Winter. The cold (or cool) season, which coincides with the rainy months, begins in late November or December and continues until

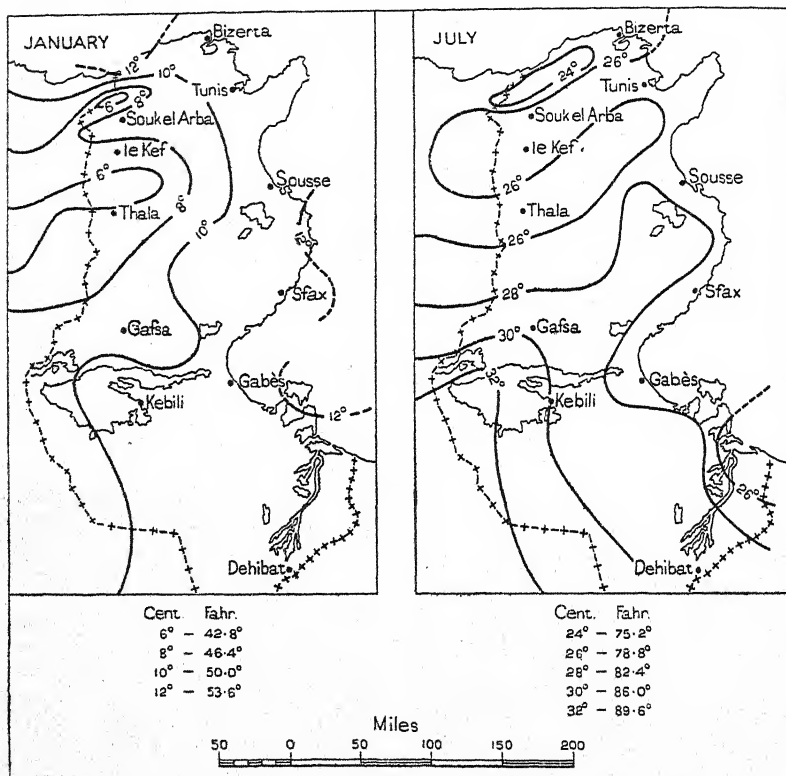


FIG. 20. Mean temperatures (degrees Centigrade) in January and July

February or March. The weather is generally sunny with cool north-west winds, though in some years dull, damp, and cold days are common. In coastal districts the influence of the sea is most marked at this time of the year: maximum and minimum January temperatures range from about 59° to between 43° and 46°. Bizerta usually records temperatures of less than 40° on only about 20 days in the year. Tunis is rather cooler than Bizerta, and in fact at times experiences almost steppe-like conditions.

Within a very few miles of the coast conditions in the winter are

much colder both by day and by night, and much of the interior of Tunisia is exposed to prolonged cold spells. Mean maximum monthly temperatures seldom exceed 50° , and, although the mean minima do not fall below freezing-point, frosts are common. Except along the extreme western boundary, however, they are not as frequent or severe as in the High Plateaux of Algeria; but thin films of ice often form on ponds during cold nights, and hoar frost is observed in the early morning. Maktar has recorded a temperature of 19° , and the mean monthly temperature for January at Thala, 3,346 feet above sea-level, is only 42° . In southern Tunisia the diurnal range is greater, but the mean maxima are only slightly higher than on the coast.

Spring. Spring is only a short transition period between winter and summer. It is usually fresh, and April and May are often cold, although the mean temperatures for both months are 60° or more at Tunis and Bizerta; in the high interior frosts are quite frequent. Really hot weather seldom occurs until late in June.

Summer. In the hot season, from about mid-June to September, average temperatures are about 77° , though there is considerable variation from year to year. Tunis averages 80° in August (which is nearly everywhere the hottest month, especially near the sea), with a range of temperature of 26° (from 93° to 67°): at Bizerta the range is only 14° (from 86° to 72°). Extreme temperatures recorded at Tunis in August range from 118° to 30° . In occasional summers temperatures exceeding 100° may be recorded for 2 or 3 days at a time, even in the small islands off the coast. The combination of excessive humidity with moderately high temperatures often makes conditions trying, especially for Europeans.

Inland high temperatures are common everywhere. Nearly all southern and much of central Tunisia lie south of the 82° isotherm in July, and even Thala averages 78° in July and August (with mean monthly maxima of 95° and 94° respectively), despite its high altitude. Typical stations are Tozeur, with an average of 91° in August, and Dehibat (latitude 32° N.), with a mean monthly temperature of 87° in July and August, and mean monthly maxima exceeding 100° from June to September (105° in July and August). These high temperatures are not unduly difficult for Europeans, because the relative humidity is low and radiation at night is rapid. The sirocco (chihili), however, sometimes brings disagreeable and debilitating days or periods of several days, because of its excessive heat and dryness. It is the cause of the highest temperatures in all parts of Tunisia. Tunis and el Djem

have both recorded 122° under sirocco conditions, Ben Gardane and Gafsa 127° , and Kebili 134.6° , one of the highest temperatures ever recorded anywhere under standard conditions.

Autumn. Autumn is a short but warm and oppressive season. June, and sometimes July, are cooler than September in many places. The main drop in temperature does not take place until October, when it is more marked than the corresponding rise in the spring. Sudden falls of temperature, amounting in some cases to 20° , often occur at the end of the sirocco.

Range of temperature. The seasonal range of temperature is much greater in the interior than on the coast. At Bizerta it is only 27° (from 52° in the coldest month to 79° in the warmest), whereas at Souk el Arba it is 35° (from 48° to 83°); and the range at Gabès is 31° (51° to 82°) compared with Kebili, 70 miles to the west, 41° (from 48° to 89°). These figures, and those in Table V, also indicate that the range generally increases from north to south at both coastal and inland stations.

The diurnal range is generally more marked in summer than in winter, and in the interior than on the coast. At Bizerta, for example, the mean daily range is 14° in summer and 12° in winter. Inland these figures are much greater, as is the contrast in the figures for the two seasons.

Visibility (Table VI)

Visibility is generally good, especially in the plains of northern Tunisia. In mountainous areas in the north fog is fairly frequent, usually forming about the time of minimum temperature, but it is quickly dispersed as the temperature increases after sunrise. In southern Tunisia winds from the desert cause a dust haze which, when severe, may be equivalent to a fog.

Along the coast damp fog occurs only in the early morning, and even then is of but short duration. Visibility is particularly good in winter, but in summer a condition best described as 'dry murkiness' is frequent. This 'dry murkiness' is sometimes so thick as to amount to fog. Patches of sea fog occur off Tunisia in early summer and autumn, and occasional radiation fogs form inland and spread over the coast in winter. Mist often appears on summer evenings and usually persists throughout the night.

The seasonal frequency of thick fog at night at various lighthouses along and off the coast of Tunisia is given in Table VI. The criterion for 'thick fog' probably varies between the individual lighthouses and

from the international definition (visibility below 220 yards), but the figures serve to indicate that visibility on the coast may often be poor, especially off Ras Enghela (north-west of Bizerta) and Cap Bon. Southward of Cap Bon fog becomes much less frequent.

Detailed information regarding visibility is available for Tunis and Gabès. At Tunis in winter, fog, with a visibility of less than half a mile, may occur at any hour, but is rare: there are six observations per season of visibility between half a mile and 2 sea miles, usually in the early morning. Conditions improve in the spring, when visibility of less than half a mile is never recorded, and even more so in the summer, which has very few records below 2 miles. These summer conditions contrast with those of most coastal areas in Tunisia, which have marked haze during the summer, especially after hot days. In autumn early morning fog and haze (under 2 sea miles) increase at Tunis, though they are still infrequent, and the evenings are often much more hazy.

At Gabès visibility in winter is much better than at Tunis, at least in the morning: fog occurs on only about one morning per season. There is a general deterioration from winter to spring, though fog is recorded only in the early morning or under calm conditions. Visibility improves during the summer, and fog and even haze are rare, except for an evening coastal haze which considerably reduces the efficacy of coastal lights at night. Haze (with a visibility of from half a mile to 2 miles) reappears in the autumn, particularly in the morning, though general conditions improve, except in the evenings.

Clouds (Tables VII, VIII)

One of the main features of the climate of Tunisia is the absence of cloud, particularly during the summer months. In the south, summer is almost cloudless, and in the north less than a quarter of the sky is usually covered. Winter is everywhere the most cloudy period, but although it is the rainy season, there are nearly always considerable periods of cloudless sky and sunshine, and overcast days without rain are unusual: in the north about half, and in the south three-tenths, of the sky is normally covered. Spring is rather more cloudy than autumn at Gabès, but at Tunis the difference is only slight.

The monthly average of cloud measured in tenths of the sky covered at Bizerta and Tunis is given in Table VII, and the number of days per season of clear, cloudy, and overcast sky at Tunis and Sousse, and in the Île de Djerba for the period 1911-1920 in Table VIII.

Precipitation (Figs. 21-24; Tables IX-XII)

Precipitation, consisting mainly of rain, although snow falls in some mountain districts (p. 84), distinguishes the various seasons

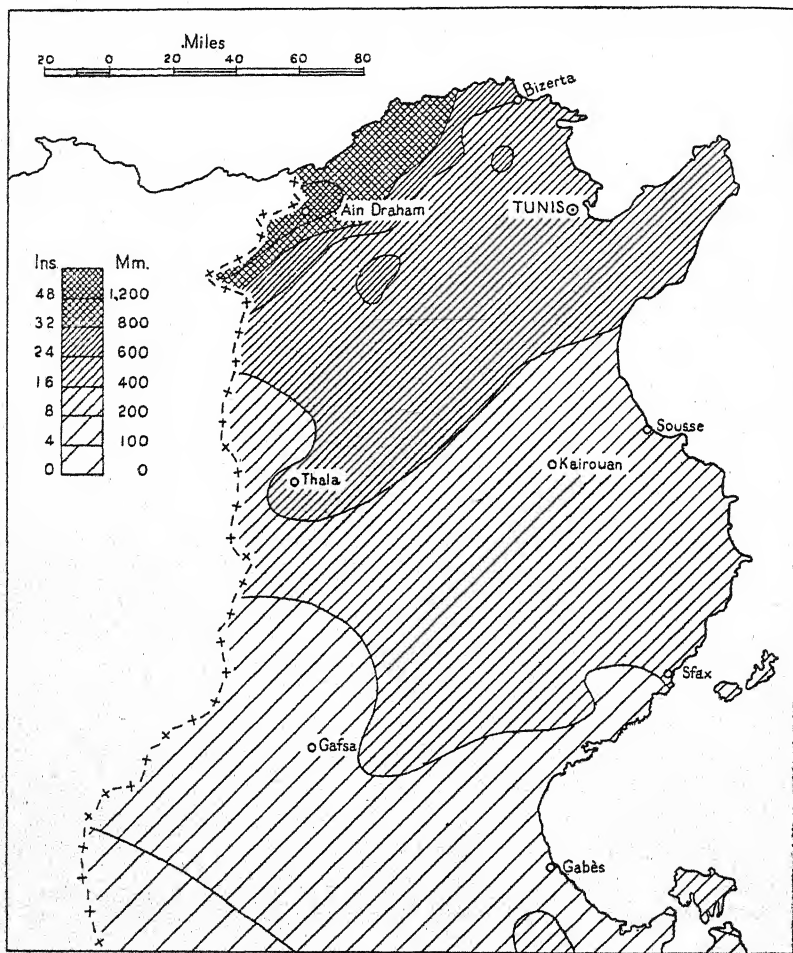


FIG. 21. *Mean annual rainfall*

in Tunisia together with temperature. Moreover, it is the element of climate that affects most directly the natural vegetation and crop production of the country, especially in the Tell.

In general the rainfall decreases from more than 30 inches in the north-west to less than 4 inches in the south (Fig. 21, Table IX).

The north-western part of Tunisia forms part of the mountainous belt extending from Algiers to Bizerta, which is the best watered part of

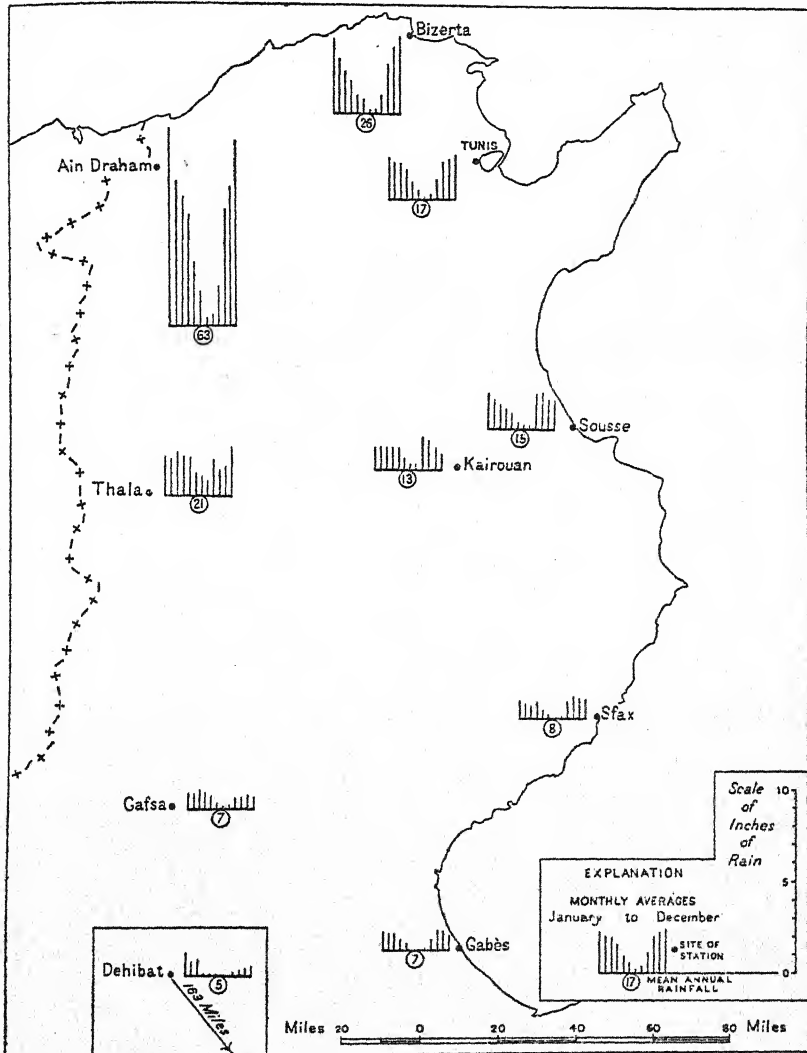


FIG. 22. *Mean annual rainfall and monthly distribution at selected stations north Africa, although the Tunisian section in general receives less rainfall than eastern Algeria. The Kroumirie is wetter, however, than the lower parts of the uplands of eastern Algeria. Nearly all the rainfall comes from north-west or west winds which have crossed wide*

stretches of water in the Atlantic and Mediterranean. The areas south of the Monts de la Medjerda are comparatively sheltered, so that to the south-east of a line joining Ghardimaou to Bizerta there is a rapid

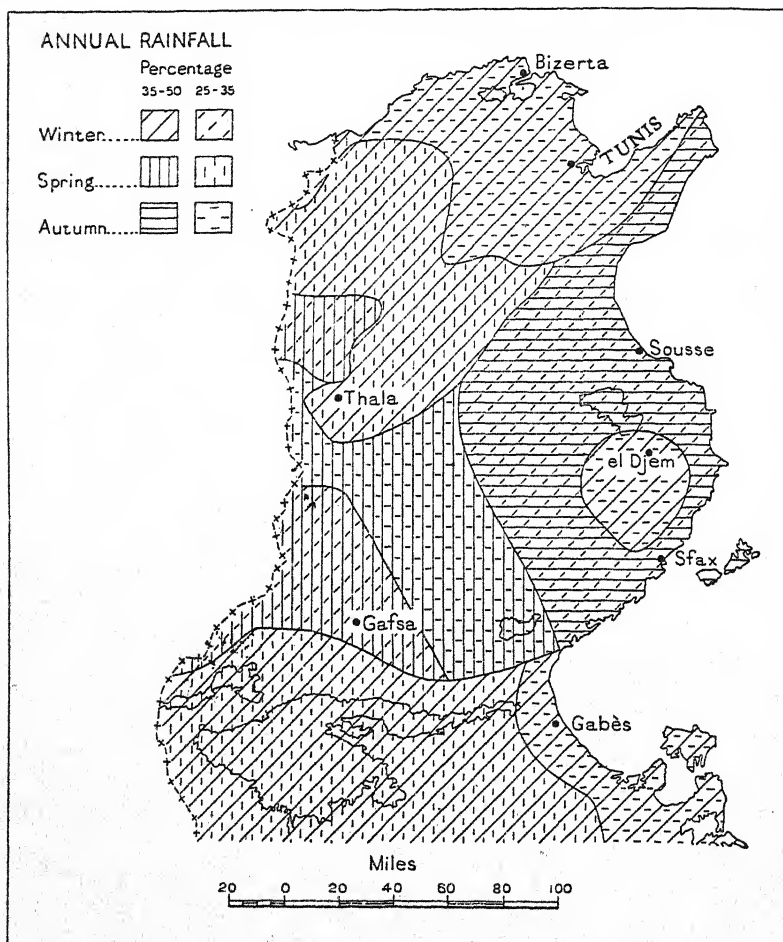


FIG. 23. *Seasonal distribution of rainfall*

diminution in the rainfall. Farther south, however, where the land rises to the Dorsale, the rainfall increases, even though the area is more distant from the sea. Beyond the Dorsale, however, rain becomes steadily less common, and in the southern prolongation of the country—the Tunisian Sahara—falls only in occasional, though sometimes heavy, showers. The 16-inch isohyet passes near

Thala, Maktar, and Zaghuan, the 8-inch isohyet through the country to the north-west and north of Gafsa and through Sfax, and the 4-inch isohyet passes to the north-east of Tozeur and through Kebili, continuing south-eastward to Remada. A small area around Matmata receives 8 inches or more because of its elevation.

Seasonal distribution is as significant as the total amount (Figs. 22, 23; Table X). Nearly everywhere June to September is virtually rainless, and 80 per cent. of the total rainfall comes between November and the middle of April: but winter, spring, and autumn are the wettest seasons in different parts of the country. North of a line joining Thala and Cap Bon through Zaghuan, and also around el Djem, between 35 and 50 per cent. of the rainfall comes in winter, with from 25 to 35 per cent. in autumn in the north-eastern and el Djem districts, and about 30 per cent. in spring in the south-west. Between the east coast and a curving line joining Cap Bon, Maktar, and Gabès, and excluding the area around el Djem, autumn is the wettest season, followed by winter. West of this zone, 35 to 50 per cent. of the rain falls in spring, with a secondary maximum in autumn, except around Gafsa, where it occurs in winter. South of a line through Gafsa to the coast winter is again the wettest season, followed by spring, except in the coastal districts of the south-east where there is a secondary maximum in the autumn.

Most of the rain falls in short periods of heavy showers. Table XI gives the number of 'rain days' per annum for certain stations, and shows a general decrease from north (e.g. Bizerta 100) to south (e.g. Gabès 33, Dehibat 17). In northern Tunisia generally about three-quarters of the annual total falls on one-fifth of the rain days, and occasionally torrential rain occurs, particularly in the Kroumirie, causing extensive damage (cf. Table X). At Tabarka 7.4 inches fell on 5 June 1915, and 6.97 inches at Ain Draham on 22 March 1908. During October 1912 Sousse had 6.1 inches of rainfall in one day, and at Kor-bous (in the Cap Bon peninsula) nearly 2.5 inches fell in 35 minutes.

Rainfall totals fluctuate greatly from year to year, particularly in southern Tunisia where a single storm may account for the whole year's rainfall or where two years or more may be completely rainless. In the relatively well-watered north the rainfall is generally adequate in three out of every four years, but even here considerable fluctuations sometimes occur (Fig. 24). Bizerta received only 16.5 inches during 1925-1926, but more than double this figure (34.5 inches) in 1930-1931, and between 1901 and 1931 there were six years with more than 27 inches and six with less than 20 inches. Ain Draham has had

as much as 2.4 inches and as little as 0.04 inches in October. The principal variations take place between November and May. As elsewhere in north Africa the autumn rainfall is of greatest significance to the farmers, although a dry April can undo all the good done by a wet autumn and winter, and a common proverb in north-eastern Tunisia and the Sahel states that 'rain in March is pure gold'.

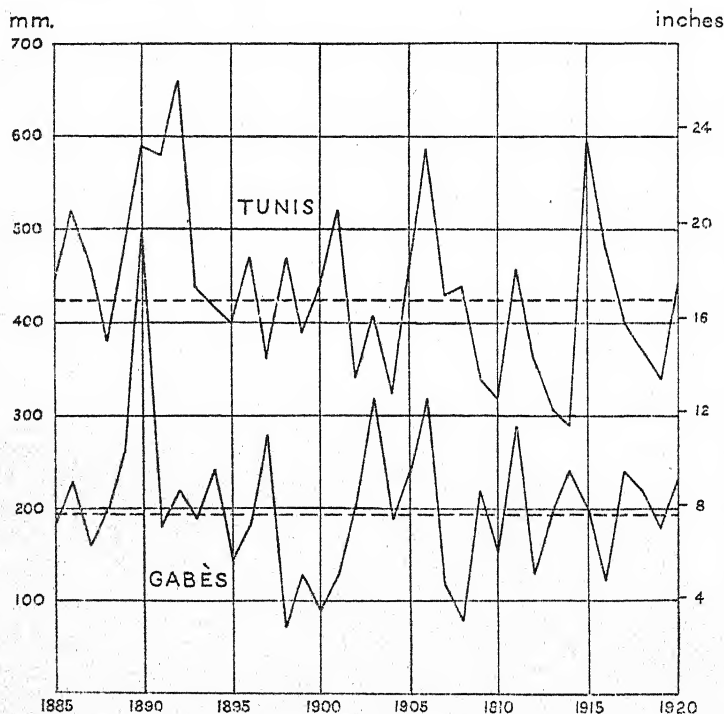
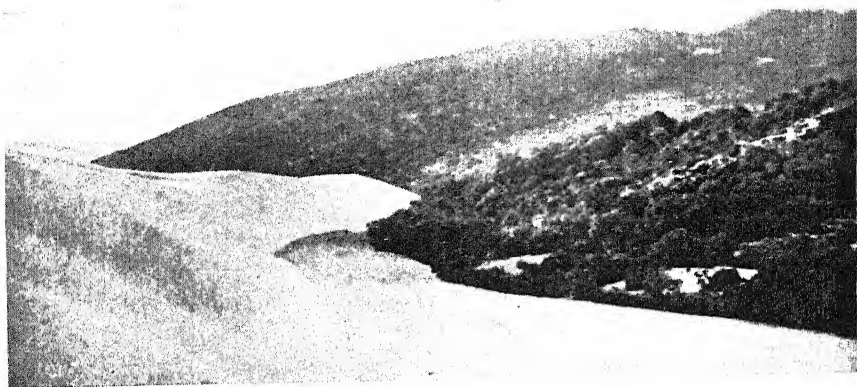


FIG. 24. Variations in the rainfall at Tunis and Gabès, 1885-1920. The pecked lines indicate the mean annual rainfall at the two stations

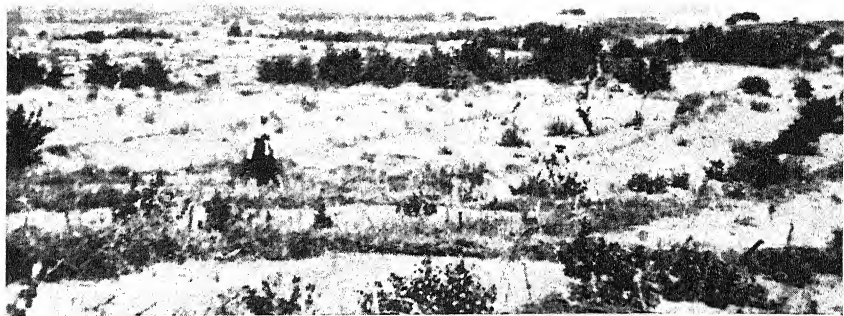
Snow. Snow is very rare on the coast and has never been known to lie for long. Inland it is more common in mountainous districts, falling on an average of 5 days per annum at heights of more than 2,000 feet and on 15 days above 4,000 feet. Snow usually falls between December and March and mostly during January and February. The Kroumirie and the Dorsale are the districts most affected, but even here the snow seldom lies for long. Falls of soft hail, which closely resembles snow when accumulated in drifts, are often more frequent than snow itself. In January and February



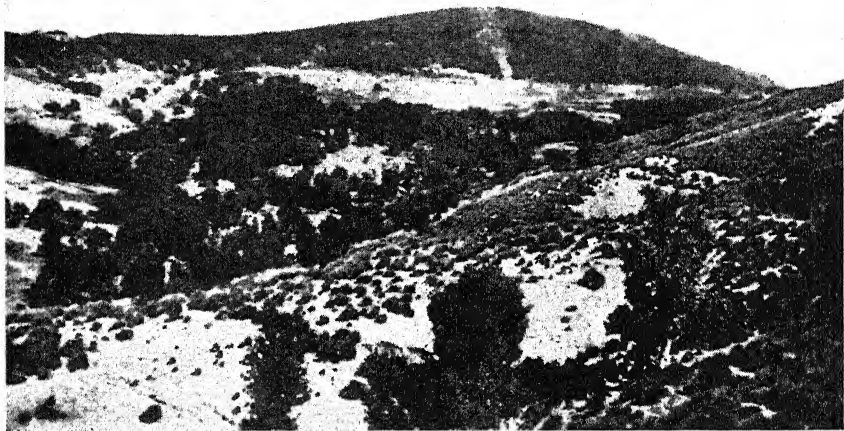
70. *Moving sand-dunes, the Nefzas*



71. *Colonization and fixing of sand-dunes by plants, the Mogods*



72. *Sand-dunes immobilized by vegetation, the Mekna*



73. *Kroumirie forest south of Ain Draham*

1891 Ain Draham had 83 inches of snow, including a single fall of over 27.5 inches, and the Kroumirie had snow on 25 days between 25 November 1928 and 30 March 1929: in other years, in contrast, snow may fall on only 1 or 2 days in the winter.

Dew. Dew is of considerable agricultural significance in eastern Tunisia, especially in coastal districts, where the dew is equivalent to 1 inch, or sometimes to as much as 3 inches, of rainfall per annum. A distinction should be made between dew proper and the absorption of water vapour in the air by the soil and by plants, a regular, daily occurrence by which the lack of rainfall may be offset. Combined with a warm winter temperature and moderate evaporation, absorption enables olives and cereals to be grown even during the driest of years by the use of dry-farming methods, as for example in the Sfax district where the rainfall is only slight (8.6 inches per annum).

Relative Humidity (Table XII). In coastal districts the relative humidity is generally between 65 and 75 per cent. Bizerta, for example, ranges from 75 per cent. in December and January to 63 per cent. in August: the corresponding figures for Tunis are 76 and 59 per cent., but its lowest figure (55%) is recorded in July. In eastern Tunisia the range is from about 70 per cent. in winter to 60 per cent. or less in summer. In upland and interior districts the humidity is generally above 60 per cent. in winter and slightly below in summer: Gafsa's figure is 66 in January and 59 in July. At Tozeur the maximum relative humidity is 58 per cent. (January) and the minimum only 44 per cent. (July), and in the desert areas of the far south the figure throughout the year is 35 per cent. or less.

Evaporation. There are few reliable statistics of evaporation, but in all parts of Tunisia evaporation is much more marked than in more northerly latitudes, especially in the summer and during periods of sirocco. In many districts evaporation exceeds rainfall, so that open reservoirs, pools, and sebkhas without sources to feed them quickly dry up in summer. In January evaporation ranges from 6 inches or more in the south to about 2 inches at Bizerta, and in July exceeds 9 inches everywhere, except in north-western Tunisia where it is between 4 and 6 inches.

Storms (Table XIII)

The number of thunderstorms each year varies considerably from place to place: in general there is a decrease from north to south. At Ain Draham in north-western Tunisia thunder occurs at all seasons (especially spring), and there are about 28 storms a year, but at

Tabarka, only 13 miles distant, there are only 8, and in southern Tunisia 5 or less. Autumn is nearly everywhere the principal season (except in the north-west), because this is the time of year when incursions of cold air from the north begin to enter the relatively warm area of the Mediterranean. These storms occur most frequently at night, and usually indicate the onset of the rainy season. The rain associated with them is sometimes excessively heavy, and has been as much as 16 inches in a day. Hail is fairly frequent in winter thunderstorms, and the individual storms are occasionally large: but only rarely does hail fall during the period dangerous to growing crops (chiefly April and May), and normally the damage done is insignificant.

Dust storms along the east coast of Tunisia are sometimes caused by the continuation of the sirocco (p. 73), and may be expected with winds of force 5 and upwards. The hot, dry wind is filled with fine dust, which may obscure the sun.

Information relating to gales and strong winds is given on p. 75.

Miscellaneous

Mirage. There are two kinds of mirage, 'inferior' and 'superior'. 'Inferior' mirage occurs in summer when the surface air, especially in shoals or shallow coast waters, is at a higher temperature than that of the air immediately above it. It is similar to the summer mirage of desert areas. The horizon is depressed so that distant low-lying objects are not seen at all, and objects which can be seen appear to be nearer, clearer, and at a higher altitude than usual. 'Superior' mirage is caused by the marked cooling by the sea of the surface layers of a relatively warm air current. Elevation of the horizon occurs, so that objects appear raised above their usual position, and may be seen even when their distance away exceeds the distance of the normal horizon. Visibility may then be exceptionally good, though these conditions often precede the formation of fog. 'Superior' mirage is fairly uncommon, though it sometimes occurs on calm evenings in coastal waters at the time when the surface temperature is falling rapidly.

Mirage is common on the coast of the Golfe de Gabès, but occurs most frequently in the desert areas of southern Tunisia. It usually takes the appearance of lakes with calm surfaces and often studded with islets. The lakes recede and change as they are approached.

Line-squalls and other Squalls. Line-squalls of varying intensity, sometimes associated with violent thunderstorms, occur, usually with

the passage of a depression over the country. Isolated squalls, coming from a westerly direction during spells of calm, or light easterly winds, are sometimes experienced off the north coast of Tunisia: there are not yet sufficient observations to explain their origin.

Waterspouts. Waterspouts are less frequent off the Tunisian coast than along the coast of Algeria, but they occur at times, usually when the atmosphere over the sea is very unstable, though not sufficiently so to cause a thunderstorm. The season of greatest frequency in the Mediterranean is, therefore, the autumn when occasionally several waterspouts may be seen at one time. One violent waterspout, 20 to 30 yards in diameter, is reported to have crossed the entrance of the Baie de Bizerte, and lasted for 10 minutes, disappearing after a run of about 1 mile. A wave was caused which did great damage, and torrential rain fell.

Coloured Rain. Winds from the east and south-east occasionally bring rain with considerable deposits of dust, which have originated in the Sahara. The dust is carried by the south, south-east, and east winds associated with depressions passing eastward along, or to the south of, the coast of north Africa.

CHAPTER V

VEGETATION AND FAUNA

VEGETATION

THE political boundary separating Tunisia from Algeria is not a botanical boundary. The relatively well-defined natural regions of western and central Algeria, which are less distinct in the east, are no longer distinguishable as such in Tunisia. The convergence eastward of the Tell Atlas and the Saharan Atlas prevents the High Plateaux of Algeria from extending into Tunisia as a marked feature. Nevertheless most of the major plant communities recorded in northern Algeria are also found in Tunisia, except cedar forests, although some with a wide range in Algeria show a meagre development in Tunisia: gum acacia forms the only tree community found in Tunisia and not in northern Algeria.

Tunisia is subject to two main types of climate, the Mediterranean in the north, and the Saharan in the south (cf. Chapter IV). Hence, the relatively mild, wet winters and summer drought of the Mediterranean climate, and the low, irregular rainfall and high day temperatures of the Sahara are the main influences on plant life, and are reflected in the two widely dissimilar types of vegetation. There is also a broad belt showing all transitions between, or modifications of, these two types.

The soils of northern Tunisia are very mixed and include leached soils or podsols, and soils derived from limestones (rendzinas). The distinction between soils with much lime and those with little or no lime is frequently reflected in the vegetation. Soils formed by wind-borne (aeolian) materials are prominent over large areas, especially in the centre and south. An unusual feature is the presence of a calcareous crust over many of the soils. It is believed that, at a period when the climate was warmer than at present, the crust was formed by the ascent of colloidal (jelly-like) solutions and suspensions during the warm and dry seasons. Crystals of gypsum are frequent in desert soils, but apart from accumulations of salt, most desert soils are not infertile as there has been neither leaching from excessive rainfall nor exhaustion from long cultivation. Low and irregular rainfall is the limiting factor both for natural communities and for cultivated crops.

The flora of Tunisia contains approximately 2,000 kinds, or species, of seed-bearing plants. The vast majority of these are known from other Mediterranean countries, and only between twenty and thirty are unique or endemic to Tunisia. The Mediterranean sectors in the north have by far the richest flora, just as they have the best developed vegetation. The flora and vegetation vary gradually from Mediterranean in the north-west, where forests are dominant, through high and low brushwoods and steppes in the centre, to Saharan in the south with its semi-desert and desert communities. Sharp lines of division are few, because of the irregularity of physical features, the occurrence of wide transitional zones, the local interpenetration of different communities, and the influence of man. Hence the lines of demarcation between the sectors shown in Fig. 25 should be taken as belts and not as sharp boundaries. The three chief regions may be subdivided as follows:

- Mediterranean region:* (a) Numidian sector.
(b) North-western sector.
(c) Punic sector.
- Transitional region:* (a) West-central sector.
(b) East-central sector.
- Saharan region:* (a) Ksour sector.
(b) Desert sector.

The predominant types of vegetation are shown in Fig. 26. The location of most of the place-names mentioned in this chapter is given in Figs. 10-12.

Coasts. Along the coasts the process of dune formation is fairly common, and large amounts of sand are deposited by wind and wave action as much as a dozen miles inland. Under Moslem law, dunes are 'dead' lands (p. 160), and become the legal property of the first person to occupy them. Since the French occupation the most important, especially in the neighbourhood of Bizerta, have been taken over by the State, mainly for strategic reasons. At the time of the occupation they were covered with a poor brushwood which was used for fuel, but in 1906 a cordon of planks and palisades, and later of living tamarisk bushes, was erected on the most seaward dunes. Soon there was a continuous green belt on the summit of these dunes and on certain others farther inland. The dunes behind were then planted with pines, at first by the use of young plants, but later by the direct use of seeds, and other plants were grown to assist in fixing the sand, such as retam broom, two Australian species of acacia, and,

in places, a species of eucalyptus. Certain grasses including marram grass, silver spike, dog's tooth grass, wild 'sugar-cane', and species of small reeds were also used to fix the dunes, and in the damper hollows black and white poplars which readily multiply by suckers (Photos. 70-72).

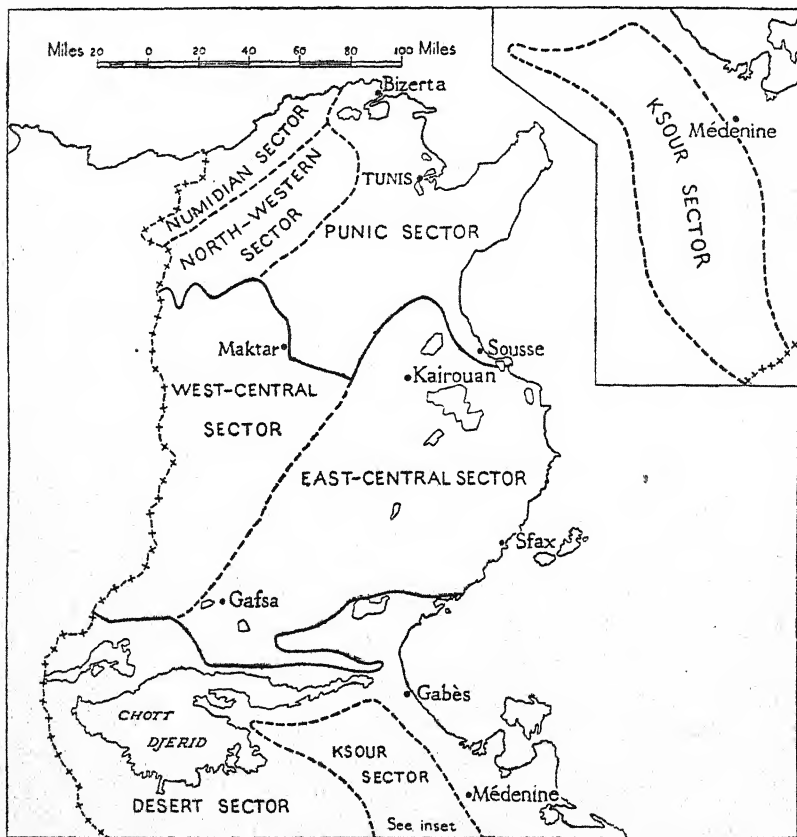


FIG. 25. Vegetation regions and sectors

On the east coast saltwort is very common on sandy beaches. Here grasses such as *Sporobolus pungens* and *Agropyron junceum* were planted first on the dunes, followed by marram grass. In places *Mesembryanthemum edule*, which was introduced to the country, replaced the natural vegetation: its fruits are edible and are sometimes called Hottentot figs. On low, rocky cliffs samphire and golden samphire occur.

The Mediterranean Region

This area comprises the whole of the northern coast and of the eastern coast as far south as Sousse: it extends inland as far as le Kef in the west, but farther east it curves south through Maktar and Pichon. Thus the whole of northern Tunisia is included in this

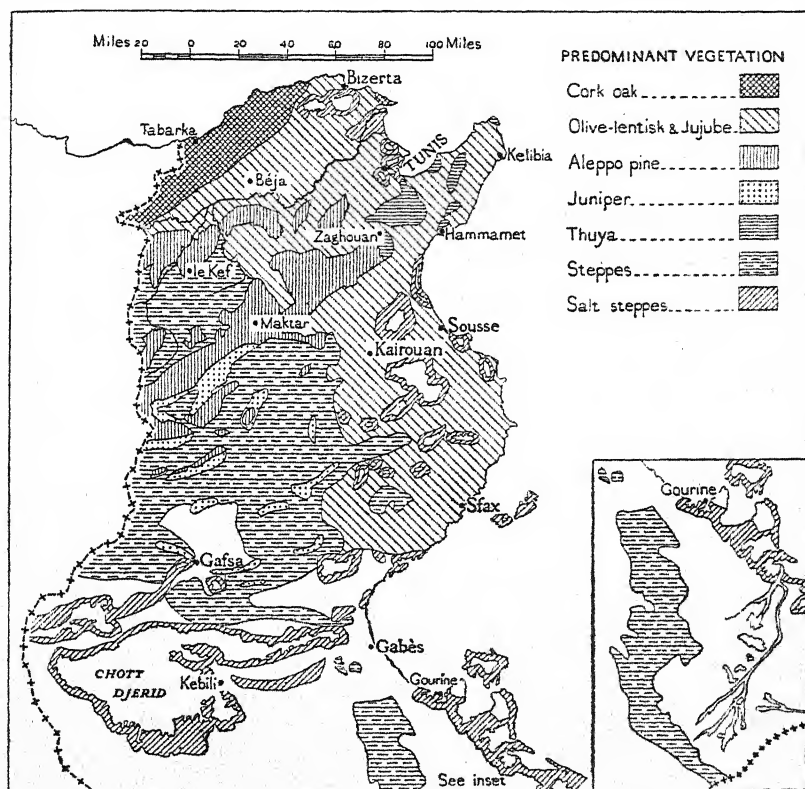


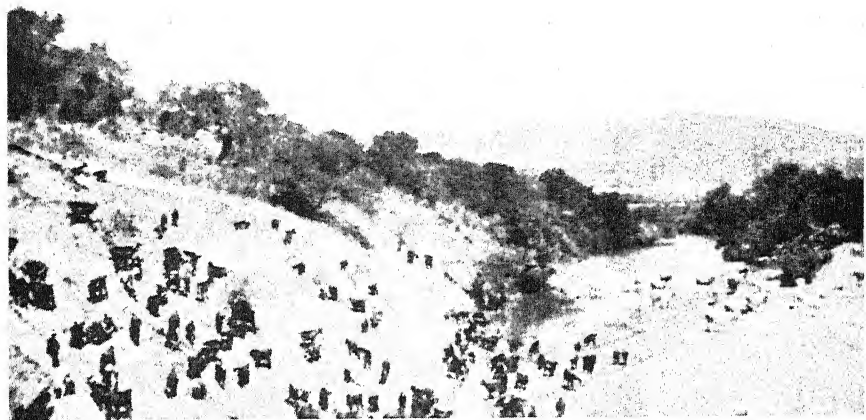
FIG. 26. *The distribution of types of vegetation*

area, and part of the Sahel of central Tunisia. The region is the best-watered in Tunisia and receives an annual rainfall varying from 20 to 30 inches, and even more in the northern coastal mountains.

The Numidian Sector. This is an easterly extension of the great vegetation sector stretching from the Oued Isser in Algeria to Ras el Koran in Tunisia. It extends inland for about 25 miles and includes the Kroumirie, the Mogods, and the Béja region. It has the heaviest rainfall in Tunisia (over 32 inches), and there are extensive cork-oak forests.

In shaded and well-watered valleys ash, elms, poplars, alders, nettle-trees, and willows are found. Higher up the hill slopes there are clumps of chestnuts, wild cherry, apple, and plum trees. Maritime pine occurs in a few areas, on or near the northern coast between Tabarka and the Oued Zouara, and at a low altitude on siliceous soils. The trees form dense forests of somewhat twisted trees up to 30 or rarely 50 feet in height, and are usually accompanied by a well developed undergrowth. They sometimes replace over-exploited cork forests. The shrubby undergrowth is composed of such plants as strawberry tree, heaths, lentisk, myrtle, and woody climbers such as smilax, clematis, and *Aristolochia altissima*, which form impenetrable thicket. Holm oaks are found in a few places in the extreme north-western coastal mountains and on dunes in the Nefzas and at Sidi Mechrig, and usually appear in the form of a low dense forest. They are not very particular as to soil, but grow best in the colder mountains where there is a rainfall of 24 inches or more. The variety found in Tunisia (*Quercus ilex*, var. *ballota*) has edible acorns.

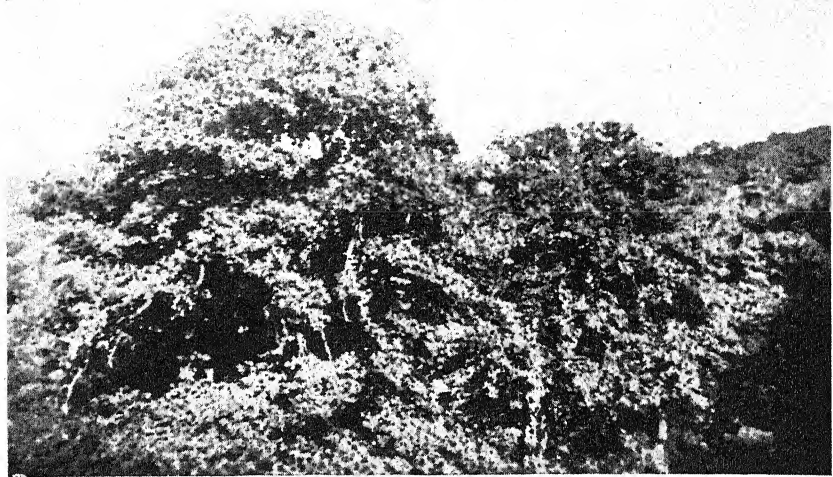
Cork-oak forests are found in the north-west over a continuous area from the Algerian frontier to Kef en Nsour and Kef Touro west of the Garaet Achkel, either in pure stands, or mixed with, but dominant over, other oaks; they form the most extensive and valuable forests of the country. The cork oak flourishes on Upper Eocene strata with loose, deep, non-calcareous soils, but is not limited to these. It grows on the plains, on sandstone-topped hills, and on the mountains below 3,800 feet, and in some places on limestone soils where the trees are of poor quality, and a special undergrowth of brambles, sloes, gorse, and diss grass develops. The typical cork-oak community is low, open wood with trees 20 to 40 feet high, and exceptionally as high as 65 feet. The tree layer rarely forms a continuous canopy, the trees being well spaced and over-topping a dense shrub layer 6 to 12 feet high, which is sometimes impenetrable if there are strong climbers. The woods are well worked, though in many cases over-exploitation has led to degradation and to the development of brushwood and finally even of herbaceous communities of bracken or asphodel. The bark (cork) is the main product, but the timber is also used, although it quickly decays: the branches make excellent firewood and charcoal. The foliage is used as fodder, but the pasturing of animals in the woods prevents natural regeneration. In the upper shrub layer the chief plants are tree-heath (*bruyère*), economically important in the manufacture of briar pipes, strawberry tree, buckthorn, myrtle, turpentine tree, rock roses, a



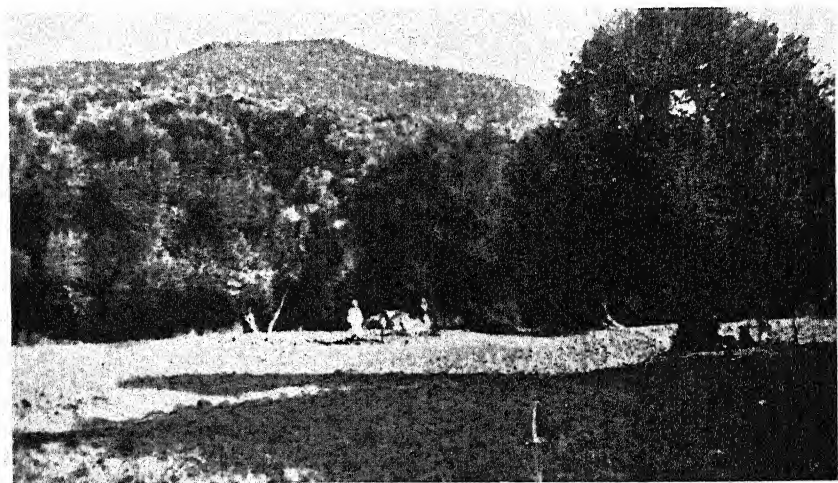
74. *Grazing of forest lands, valley of the Oued Sedjenane*



75. *Degradation of forest by fire, the northern Tell*



76. *Portuguese (zen) oaks, the eastern Kroumirie*



77. *Wild olive-trees, the northern Tell*

privet-like plant (*Phillyrea media*), and the dwarf palm. Among the numerous woody climbing and clambering plants which bind the shrubs together are smilax, ivy, asparagus, roses, brambles, and a species of honeysuckle. Under the principal brushwood layer there are secondary shrubs such as lavender, heath, and a daphne. The field layer of herbs is poorly developed, except in clearings where various types of ferns occur (Photos. 2, 73, 74).

Deciduous oaks, which include the Portuguese or zen oak and the Afarès oak, are only found in the Kroumirie where they replace the cork oak on deep, cold, damp soils: the principal tree is the Portuguese oak, which requires a rainfall of more than 32 inches and high humidity in order to flourish well. It prefers slopes facing north, north-west, or west, but grows well in other, less favourable sites if the rainfall be sufficient. Although the trees show seasonal leaf-fall, this usually occurs rather late (in January), and the leaves may even be described as sub-persistent rather than deciduous. The typical community is dense, high forest with a continuous canopy casting a deep shade under which the soil remains almost continuously damp. The Portuguese oak sometimes occurs in pure stands, but it is also mixed with such species as the Afarès oak, and more especially the cork oak, which it replaces in damp, shaded valleys such as the Oued Bélif and on river banks. It is not found above the upper limit of springs, and where this is at a low altitude, cork oaks grow above. Undergrowth and field layer are very poorly developed owing to the thick tree cover, except where the trees thin out. Here the same shrubs are found as with cork oaks, but climbers are almost non-existent, although ferns grow abundantly (Photos. 73, 76).

The North-western Sector. This is a continuation of the southern Tell vegetation sector of Algeria, and it extends inland of the Numidian sector as far south as le Kef, and is limited on the north-east by a line through Mateur and Tebourba. It includes the southern slopes of the Monts de la Medjerda, the valley of the Oued Medjerda and of part of its tributaries, the Mellègue and Tessa, and the plain of Mateur. It receives an annual rainfall of from 16 to 24 inches. There is a considerable amount of Aleppo pine found around le Kef and in other scattered localities. It is used in these areas for reafforestation and quickly rejuvenates from seed. Along the valley of the Oued Medjerda the pine forests give way to jujube brushwood (Photo. 12).

The highest developed community in this sector is the olive-tisk, which occurs as low forest or high brushwood and grows over a wide area around and to the north of Béja. It is dense and

impenetrable on loose light soils, but more open on heavy clay soils. It is frequently associated with, or contiguous to, cork-oak woods on non-calcareous soils, which it replaces on the southern slopes of the Monts de la Medjerda, and jujube brushwoods, to which it gives way in the Medjerda valley, or even woods of Aleppo pine. The two chief constituents are the olive and the lentisk, and the low trees or high shrubs associated with them vary with the nature of the soil and include carob or St. John's bread, betoum or Atlantic turpentine tree, and jujube. Shrubs such as dwarf palm, buckthorns, sumach, spurge-laurel, two species of asparagus, a gorse-like plant (*Calycotome spinosa*), and a legume (*Anagyris foetida*) are found with the lentisk. In some communities there are numerous woody climbers or clamberers, which link up bushes and trees; among them are honeysuckle, clematis, rose, smilax, ivy, black bryony, and another species of asparagus. Elsewhere the shrub layer is much more open and the climbers are less developed. Where the woody growth is thick the herbaceous layer is meagre, but in more open country it forms an almost continuous and varied carpet, which dies down in summer. Where cutting and fire have led to degradation, there is low, open brushwood or even stony, broken turf with annuals and plants with bulbs and rhizomes (underground stems) (Photos. 75, 77).

The Punic Sector. This sector includes the whole of north-eastern Tunisia and has a mixture of many different communities. It includes the Cap Bon peninsula, the Lower Tell, and the north-eastern part of the High Tell (an extension of the Dorsale), together with the coastal plains of Bizerta, Tunis, and Hammamet. Most of the mountainous region receives a rainfall of from 16 to 24 inches a year, but south of Hammamet the amount diminishes.

There is a broad belt of Aleppo pine woods running north-east along the highland backbone; the woods are usually open and much degraded. Where they are thickest and least exploited the undergrowth is sparse, and the trees have straight trunks reaching a height of 40 feet. Usually there is wider spacing and a denser undergrowth composed of a wide range of shrubs which includes junipers, turpentine tree, lentisk, hawthorn, rock roses, yellow jasmine, rosemary, and *Globularia alypum*. The two last are constant and characteristic associates of Aleppo pine woods. Apart from clearings, there is little or no herbaceous layer, and the forest floor is merely covered with fallen pine needles.

Near Zaghouan and in a few areas to the north-east near Ste. Marie du Zit and in the Cap Bon peninsula, Aleppo pine woods give way

to woods of Barbary thuya or sandarak. This usually forms open woods with trees 30 to 36 feet in height and from 3 to 5 feet in circumference, and with an abundant undergrowth. Because these woods have been extensively exploited, they are now rare, and are often reduced to poor brushwood and even to low-lying bushes, or to low, meagre forest with large clearings and a steppe vegetation. The thuya thrives in warm, dry conditions, and because it is able to throw up shoots from stools it is better adapted to resist fires than the Aleppo pine. It is easily disseminated and can withstand shade in the early stages of its growth, which is very slow.

There are several stretches of olive-lentisk west and south-east of Bizerta, in the Cap Bon peninsula, and in a belt running north-east from near Pont du Fahs to the thuya woods near Zaghuan. Kermes oak woods occur in two small areas in the Cap Bon peninsula, north of Tozebrane and north of Kelibia. Elsewhere in this sector there are large areas of jujube brushwood, especially in the region west of Tunis. At its best the scrub consists of high bushes fairly close together and often formed almost exclusively of jujube, although it is sometimes mixed with cottager's tea plants. The herbaceous layer is formed by annual grasses and also by a few perennials; woody climbers are rare. In winter the shrubs are bare of leaves, and the scrub is a characteristic grey. It is very resistant to drought and takes the place of Mediterranean hard-leaved communities where the humidity is low and the dry season long. The jujube prefers deep soils and does not grow at high altitudes: when degraded it gives way to meagre pasture with annuals such as twisted spear grass, or to a poor steppe vegetation of wormwoods.

The Transitional Region

The transitional area extends south of a line joining le Kef, Maktar, and Sousse to a line drawn roughly from west of Gafsa to Maharès. The greater part is steppe, with the exception of the south-western portion of the Dorsale and other isolated ridges, and the Sahels of Sousse and Sfax. The rainfall decreases fairly rapidly from about 16 inches a year in the north and in the mountain area, to about 6 inches a year in the south. There are few sources of water other than the rivers, which mostly dry up in the summer months and do not reach the sea. Hence woody vegetation is replaced by steppe wherever the rainfall is low and the freshwater supply insufficient.

The West-central Sector. This is a continuation of the eastern sector of the Saharan Atlas of Algeria, which extends as far east as a line drawn south-west from near Pichon to Gafsa. It includes the High Tell and a considerable portion of the steppes which extend to the south of it. A broad belt of Aleppo pine stretches from the Monts de Tébessa in Algeria north-eastward along the Dorsale. There are also some woods of holm oak south of Thala and on the higher parts of Djebels Tiouacha and Mrhila. On the southern slopes of the inland backbone near Fériana, and in scattered localities as in Djebel Sidi Aich, the Aleppo pine woods give way to open, low woods of red juniper which can stand drier conditions, both of atmosphere and soil, than the Aleppo pine. The trees are rarely more than 15 or 18 feet in height, and rejuvenation is slow, as stools do not send up shoots, and seeds usually germinate only after passage through animals. The shrub layer is open and sometimes very sparse, and consists chiefly of common rosemary, a joint fir, and *Globularia alypum*. Numerous perennial herbs, often sub-woody at the base, and a large number of annuals form the field layer.

Elsewhere in this sector steppe communities are dominant and the one layer of vegetation is composed exclusively of herbs and sub-shrubby plants (that is, plants with herbaceous branches but a more or less woody perennial stem or stem base): these grow in spaced tufts so that the soil can be seen between them. In this sector alfa or halfa steppe is found over a considerable area where the rainfall is under 20 inches a year. It replaces degraded red juniper or Aleppo pine communities in some areas, but elsewhere is probably the natural vegetation. This perennial grass, which is of considerable economic value (pp. 300-301), is extremely resistant to drought and cannot withstand the least stagnation of water at its roots: high concentrations of mineral salts also completely prevent its development. It grows in large tufts which may reach a height of 3 feet, and are sufficiently close together to give the appearance of closed turf from a distance. Very few plants accompany alfa except ephemerals, which develop in spring in the shade of the tufts and quickly flower, set seed, and die. The grass is grazed by camels, but not by sheep; its leaves, together with those of certain other grasses, are gathered and exported as esparto grass principally for paper-making.

Chih or white wormwood steppes replace alfa steppes on muddy alluvial plains, flat clay soils, and in depressions and valley bottoms which are not saline. The chih (*Artemisia herba-alba*) grows in spaced tufts and is often accompanied by another wormwood (*A. campestris*).

This steppe gives poor pasturage and, with varying soil conditions, merges into other types of steppe. Sparte or sennagh grass often grows on clay or saline soils. The sparte grass is the principal constituent, but it is often mixed with wormwoods, and between the tufts a number of perennial herbs and rare annuals occur. The sparte steppe is poor pasturage; its leaves are exported, like those of alfa, under the general name of esparto grass. There is an area of desert in the extreme south of this sector to the north-east of Gafsa, spreading into the east-central sector.

The East-central Sector. This sector lies to the east of the west-central sector and extends to the coast and southward to the Chott el Fedjadj, with the exception of a re-entrant opposite la Skhirra which reaches inland to a point about 10 miles to the south-east of el Guettar. The region includes the Sahels of Sousse and Sfax, which are replaced farther inland by the Low Steppes. The annual rainfall decreases from nearly 16 inches near Sousse to about 8 inches in the south.

Jujube scrub is the natural vegetation all along the coast and on the clay plains, wherever there is no cultivation, but where it is degraded it passes into poor wormwood steppe (Photo. 78). Salt marshes, around which a peculiar type of vegetation flourishes, are widely distributed along the coast, around the Îles Kerkenna, and inland as well. There is no sharp distinction between coastal salt-marshes, saline steppes, and inland salt-marshes. The vegetation consists of very specialized plants known as *halophytes* which are suited both in structure and physiology for growth in saline soils. Species such as sea-rushes, rice-grass, sea-lavenders, and many members of the chenopod family may be locally dominant. The salt marshes round the chotts and sebkhas merge with drier salt steppes which form excellent pasturage and remain green all the year. The vegetation in the coastal salt-marshes is generally more continuous than that of the inland sebkhas.

There are also areas where grass steppes are locally dominant. In the Sahel of Sousse, apart from the areas devoted to olive and cereal cultivation, there are areas largely covered with steppes dominated by grasses (such as *Stipa tortilis*, *Vulpiella incrassata*, and *Andropogon hirtus*) which are normally associated with jujube communities. It is thought that these low grass steppes are of secondary origin and have followed the destruction of jujube brushwoods either immediately, or after abandonment of cultivated fields. In a very few areas there is an abundant vegetation of 'metnane' (*Thymelaea hirsuta*). The twisted spear grass steppe is of secondary origin, and since cultivated

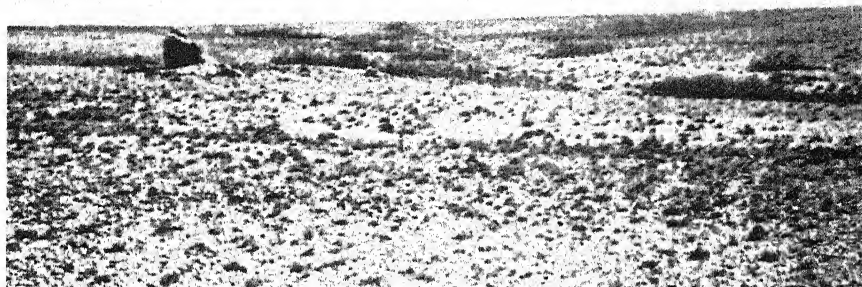
lands are alternatively extended or lessened, the areas covered by it and its related communities frequently fluctuate. In the more permanently cultivated parts of the Sahel the prickly pear or Barbary fig-tree, introduced from America, is seen in hedges and clumps (Photo. 131).

On inland ridges such as Djebels Meloussi, Orbata, and Chemsî there is a certain amount of red juniper, but elsewhere steppe predominates. The juniper woods give way to alfa steppe in some places, but drinn steppes are dominant in many dry parts and especially to the south of this sector, which is sandy and semi-desert. The drinn grass, suited for growth on mobile sand, can withstand both prolonged wilting and the piling up of sand. Its extremely long and well-developed root system helps to fix the sand, and abundant root-hairs enable the plant to extract the maximum possible quantity of water from the permeable substratum. Drinn tufts are lower than those of alfa and sparte, and its leaves are hard. Some low, woody legumes, especially retams and genista, and perennial and annual herbs are often associated with drinn grass. At certain times of the year it affords excellent pasture for camels, and the natives collect and eat the grains which they call *loul*.

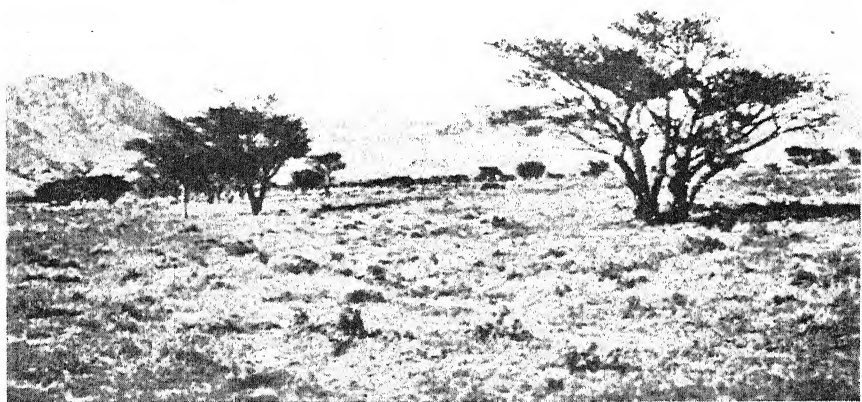
In this sector there are two plantations of gum acacia: one is north of Gafsa; the other, and by far the larger, is the Bled Talha forest south-west of Sfax and north-west of the Sebkha en Noual. The gum-trees are widely spaced, and the community is tree-savanna rather than true forest in type, as the number of trees varies from less than two to about ten per acre. The superficial roots are of great length (up to 130 ft.) and form a dense and wide-spreading network. A few shrubs grow with the gum acacias, in particular jujube and sumach. The herbaceous field layer of Saharan or sub-Saharan plants is very uniform, but has not been studied in detail. The fruiting of the gum acacia is very irregular and does not occur every year. Many of the seeds are attacked by a beetle, and growth is slow: trees 16 inches in diameter are 120 or 130 years old, and the largest tree in the forest, 3 feet in diameter, is at least 300 years old. There is no doubt that the forest has decreased in size very considerably. The natives have mutilated many of the trees, but have difficulty in cutting them down because of the hardness of the wood (Photo. 79).

The Saharan Region

The Saharan region stretches southward from north of the Chott Djerid and its eastern arm, the Chott el Fedjadj. There is no sharp



78. *Steppe about 15 miles west of Maharès*



79. *Gum-trees of the Bled Talha*



80. Hofra near Douz in the Nefzaoua

line of demarcation between steppe and desert vegetation. The annual rainfall, about 8 inches in the north decreasing to almost nothing in the south, causes more and more open vegetation, and finally typical open desert vegetation, except for salt marshes, salt steppes, and the steppe area of the Monts des Ksour. While plant life is scarce, true desert is by no means deprived of all vegetation, and with varying conditions the number of communities is fairly large.

Two distinct types of flora and vegetation occur in the desert, the perennial and the ephemeral. The perennial vegetation consists of a few trees, in particular the betoum, shrubs such as jujube and tamarisks, and a relatively large number of sub-shrubs and perennial herbs. Water is the factor limiting the development of plants in desert areas, and, with very local exceptions, only *xerophytes* (plants specially adapted in structure and function to survive drought) can exist to form one or other of the communities. Many perennial desert plants are dwarf and compact, with small leaves and stiff foliage and spines; they develop hairs and produce ethereal oils. All these devices in varying degrees retards the loss of water, while their extensive root systems, with the strong development of root-hairs, increases the intake of water. There are also little-understood internal factors which enable some desert plants to withstand prolonged wilting.

The ephemeral vegetation (Arabic *acheb*) consists of delicate herbs, the seeds of which germinate immediately after rain: the resultant plants grow rapidly, flower for a very short period, set fruits and seeds, and then die. The dried leaves and stems are quickly reduced to powder by desert winds so that nothing remains except the seeds, which are scattered through the desert in a dormant condition to await the next rains. The *acheb* plants show no structural or functional peculiarities adapted to desert conditions except those connected with their very short life-history.

The struggle between different kinds of plants is not so intense in the desert as in the better-watered regions, but wild animal life, and still more man and his domesticated animals, have a profound influence on desert and semi-desert vegetation. Extensive, and often excessive, grazing, has led to the reduction of specially palatable plants, and to the increase of useless ones such as the oleander, poisonous to camels, and retam broom, also carefully avoided by animals. Goats and sheep are grazed in large numbers in the neighbourhood of settled oases, and often wander considerable distances for several days, thereby modifying the vegetation for a radius of up

to 24 miles or more; camels feed over a much wider area. Along caravan routes there are broad tracts where all vegetation fit for fuel or forage has been used.

The Ksour Sector. The main area of desert is separated into eastern and western portions by the Ksour sector, which is partly steppe, but differs only slightly from the desert region. It stretches from Kebili on the shores of the Chott Djerid, along the line of Djebel Tebaga, and southward along the Monts des Ksour to Dehibat near the Libyan border. A considerable area along the higher land of this sector is occupied by alfa steppe. This passes into other types of steppes towards the outer edges, where it merges imperceptibly into desert communities.

The Desert Sector. Areas from which all plant life is absent occur in very few places, but owing to the very scanty and irregular rainfall over the whole of southern Tunisia, vegetation is confined to places where water accumulates after rain and is conserved in the soil for a while. A number of major plant communities can be recognized in the desert, although the vegetation is very sparse and open. For convenience they may be considered under the following headings: oases, depressions (*dayas*), oueds, sand deserts (*ergs*), gravel deserts (*regs*), and stone and rock deserts (*hammadas*). In addition there are considerable areas of salt marsh and salt steppe around the southern shore of the Chott Djerid, along the coast from Gourine to the frontier, and around the Île de Djerba, where the salt-marsh vegetation is similar to that described above (p. 97).

Oases occur where perennial water reaches the surface or where the water-table is sufficiently high to give a perennial supply. They are of varied size, but most are, or have been, under cultivation. The transition from an oasis to one or other type of desert is frequently abrupt. The date-palm is the outstanding feature of oases (Photo. 80); its native country is unknown, but it has been in cultivation for at least 5,000 years. Irrigation is essential to maintain growth, and in the larger oases there are gardens with vegetables, flowers, and fruit-trees of many kinds besides the date-palm plantations. Barley is the chief cereal grown: the foliage provides animal fodder in the early stages of growth, and two crops can be grown in a season. Wheat and millets are also common. Fig-trees are frequent, and vegetables and cultivated herbs include onions, tomatoes, gourds, mint, and fennel. There are few weeds, and the natural vegetation is frequently almost or quite destroyed. The oleander, often the most conspicuous of the remaining vegetation, is sometimes accompanied by tamarisks,

chaste-tree, and poplars. Between and beneath these taller plants cosmopolitan marsh plants form a second layer, and include reed grass, reed mace, rushes, club rush, and sea sow-thistle.

Dayas are depressions or basins separated from one another by low ridges, or stretches of plain receiving drainage from limited areas. The soil is often fertile and of fine texture, but the water-supply is uncertain and is not conserved as in the oases. Subterranean drainage probably occurs and prevents the accumulation of salts found in and around chotts. The characteristic vegetation consists of betoum and jujube sometimes accompanied by olive. Betoum is unprotected by spines, and its leaves and shoots being extremely palatable to herbivores, heavy grazing reduces its numbers and limits young plants to those that grow up through protecting jujube bushes, which are avoided by animals because of their many spines. The betoum or Atlantic turpentine tree, which grows to a height of 50 feet and has a circumference of 14 feet at 3 feet above ground, casts a dense shade, an unusual feature in a desert tree. The lowest branches of a mature tree usually mark the height to which browsing camels can reach. Herbaceous plants commonly found in dayas include turkey-red plant, some chenopods, and desert grasses.

Oueds are the valleys of watercourses or lines of depressions which are dry for the greater part of the year, or for a succession of years. Their water-table is, however, often not very far below the surface. The beds of oueds are often sandy, but the sand may overlie clay or other deposits, thus modifying the water-supply and hence the vegetation. Species of tamarisk and retam broom are characteristic of oued vegetation.

Sand deserts (ergs) have a highly permeable, but not infertile, surface where all transitions to steppe vegetation and salt marsh are found. A very open vegetation dominated by drinn (p. 98) frequently occurs, with occasional bushes of retam broom; the ephemeral acheb (p. 99) develops after rain. On mobile sand-dunes there is little or no permanent vegetation, and even acheb is absent or at most poorly developed.

Gravel deserts (regs) sometimes represent former flood plains and are frequently composed of gravel on a clay substratum. The vegetation is extremely sparse, and is composed of drought-resisting perennials and short-lived acheb. The flora is very varied, and includes chenopods, crucifers, rock-roses, and grasses.

Stone and rock deserts (hammadas) are the most barren of all areas, where wind action is strong and inimical to all vegetation,

except indirectly when it leads to the deposition of sand on the stony surface. Vegetation is extremely sparse and open, and the majority of the perennial plants are dwarf and sub-shrubby.

The passability and cover provided by the various woods and brushwoods described above is summarized from the military point of view in the following table:

	PASSABILITY				COVER FROM VIEW
	Density	Height	Diameter	Undergrowth	Ceiling
Cork oak	Open	15-40 ft.	1-4 ft.	Dense	Broken
Holm oak	Rather close	10-50 ft.	Up to 2 ft.	Sparse	Fairly continuous
Deciduous oaks	Close	Up to 120 ft.	Up to 5 ft.	Sparse	Continuous
Aleppo pine	Often close	Average 26 ft. (up to 60 ft.)	1½-4 ft.	Dense	Fairly continuous
Maritime pine	Often close	30-120 ft.	Up to 4 ft.	More or less dense	Often continuous
Red juniper	Open	16-23 ft.	Up to 2 ft.	Often sparse	Broken
Barbary thuya	Usually open	Up to 30-40 ft.	1-1½ ft.	Dense	Usually much broken
Olive and lentisk	Close	10-20 ft.	Up to 1 ft.	Dense	Continuous but low
Jujube brush- wood	Close	15-20 ft.	—	Dense	—
Gum acacia	Trees 20-50 yards apart	15-25 ft.	Up to nearly 3 ft. in old trees	Open	Broken and mostly light

FAUNA

THE fauna of Tunisia has been greatly modified since historic times because the destruction of forests has either destroyed certain animals or limited their distribution, and man has introduced both wild and domestic animals into the country. Elephants, many of which existed in the past, appear to have been finally destroyed by the Romans, and bears had disappeared by the beginning of the present century. The camel, introduced early in the Christian era, is the most important domestic animal brought to Tunisia.

Lions are almost extinct, although a few are occasionally reported in the Kroumirie near the Algerian frontier and near Fériana. They were far more numerous in Carthaginian times, when they used to prowl round villages and cities. Leopards are still found in the north-west of central Tunisia. There are a few cheetah in the extreme south of the Djerid, and also the caracal lynx; a number of pardine lynx are found in the mountains and forests of western Tunisia. Striped hyenas occur fairly sparsely throughout the country. Genets and the common jackal are fairly abundant, but the common ichneumon, the

Egyptian mongoose, is rare. The badger-like zorilla is found in the south.

The Barbary red deer is peculiar to the forested regions of western Tunisia and the adjoining districts of Algeria, where a few are found, notably south of Tabarka and in the Kroumirie. Deer were introduced to the country by the Carthaginians, who kept them in a semi-domestic state until they were sacrificed. In the extreme south of Tunisia the addax antelope is still found. Both the hartebeest and the leucoryx are now extinct, although these two antelopes were once found as far north as central Tunisia. The dorcas gazelle is also found in the south.

Wild pig occur in certain parts of the country, notably in the Kesra forest south-east of Maktar, in spite of the large number killed by hunting. Wild goats are common. A herd of over fifty buffaloes, said to resemble the domestic (Indian) buffalo of the Levant and Italy, is kept around Djebel Achkel north of Mateur: it is the private property of the Bey of Tunis and is supposed to have originated in a gift from a former King of Naples to the Bey. The wild ass, apparently identical with that of Nubia, has been reported in the far south. One of the most interesting ruminants in the country is the udad or Barbary sheep (mouflon), found in the Monts des Ksour.

The Barbary otter is present in the Oued Medjerda and some of the salt lakes. Tunisian hedgehogs, which are peculiar to the country and to Algeria, and another species, *Erinaceus deserti*, which is common to all north Africa, are found in some districts. There are elephant shrews in the south, especially in the district of the chotts, and porcupines, a large octodont rodent, two species of jerboa, hares, and various other rodents in most parts of the country. Barbary apes, which are common in Algeria and Morocco, do not appear in Tunisia, and the baboon seen in the oases of the south is not indigenous but has been imported by the natives.

The birds are mainly those common to the southern Mediterranean. They include eagles and other birds of prey, bustard, heron, cormorant, pelican, plover, wild duck, woodcock, snipe, grebe, wild pigeon, ortolan, sand grouse, partridge, quail (in April and May), and many small kinds according to the season. There is a species of bunting called the Djerid sparrow which is almost peculiar to the country, and is especially found in the Djerid. Flamingoes are common around the salt lakes. The ostrich is now extinct. Falcons are snared and trained in the neighbourhood of le Kef.

The number of snakes and reptiles in Tunisia described by ancient writers appears to be largely based on fables. The Egyptian cobra seems to be indigenous in the south, where also the horned viper is found. The most infested region in Tunisia lies in the southern mountains, where the natives had to abandon parts of Djebel Seldja north-east of the Chott el Rharsa because of the multitude of reptiles. Some nine or ten other species of snakes are present in the country, including the 'zorreïg' (*Echis carinata*) found near Sfax: it twines around branches of the tamarisk bushes near springs and wells. Scorpions are more dangerous than in Algeria and Morocco, and their sting is often fatal. Lizards are abundant, and most species of Mediterranean tortoises are represented.

The coastal waters are very rich in fish, and the tunny fisheries of the north, especially around and immediately south of the Cap Bon peninsula, form one of the main sources of supply in the world. Sardines and anchovies are caught in the north-west near Tabarka, and the red or precious coral (*Corallium rubrum*) of the Mediterranean is obtained from the coral banks which stretch from Cap Serrat to Bône in Algeria. Octopus is found between Sfax and the Îles Kerkenna, and sponges in the region of the Île de Djerba, the Golfe de Gabès, and the Îles Kerkenna. Soles, mullet, and gurnet are fished around the Cap Bon peninsula, and in the extreme south in the Bahiret el Biban. Fish are also plentiful in the Garaet Achkel. Shell-fish are common. The fishing industry is described in Chapter XIII.

Locusts occasionally come in clouds to the Tell, where they completely devour the crops; those which destroyed the crops in Algeria in 1845 were said to have originated in the Djerid. Butterflies are rare, possibly because of the number of birds that destroy the caterpillars: a few are found in the mountains. There are several species of mosquitoes, *Anopheles maculipennis*, *A. algeriensis*, and *A. multicolor* being malaria-carrying (p. 110).

Sport

Game, as shown above, is available in much variety, and small game is plentiful. A gun licence is necessary in ordinary times, obtainable from the Director of Public Safety. The season lasts from 15 August to the beginning of February, and from 15 March to 15 April for migrating birds. Guns, fire-arms, and powder may be imported only by special permission of the Director of Public Safety, but filled cartridges, which are taxed, are allowed under certain

conditions. Empty cases with percussion caps may be imported and can be filled in Tunis. Permits to shoot game must be obtained from the Director of Forests or the Director of State Domains for lands under their jurisdiction. Permission to shoot birds on the Lac de Tunis must be obtained from the fishing concessionaires.

Hunting of the Barbary red deer, mouflon, and addax is always forbidden except under personal licence from the Director-General of Agriculture, who also gives special permits to kill for scientific purposes during the closed season and to shoot protected species. Permission is rarely given to hunt the Bey's buffaloes.

CHAPTER VI

DISEASES, PESTS, AND HYGIENE

General

TUNISIA, in common with the rest of Barbary, has experienced a degree of isolation for many centuries. Contact with Europeans was limited, pirates and corsairs controlled the coasts, the Sahara was traversed only by certain routes, and the coastal and desert routes towards the east were as long and arduous as those to the south. Barbary did not share in the trade of West Africa or the West Indies, from which certain diseases and pests might have been derived. There were no desert routes by which sick men, pests, or parasites were likely to cross the Sahara from south to north, but these conditions of immunity are likely to be broken down by modern communications, which are both easy and fast.

The great pilgrimages to Mecca and Medina, where the peoples and infections of Asia and Africa can mingle, have not greatly affected the isolation of Barbary because of the great distances and the small number of pilgrims.

The prevalent diseases of Tunisia, as of Barbary, are, therefore, distinctly Mediterranean. There are opportunities for infection and epidemics especially in the crowding of people in the oases, towns, and ports, and in the local pilgrimages to zaouias or shrines, where people remain crowded under most insanitary conditions, sometimes for considerable periods.

The movements of nomads spread diseases; famine or distress may result from rainfall below the average or from economic depression, and encourage outbreaks of typhus and other epidemics. Rainfall above the average, especially in the spring, may stimulate the breeding of the malarial mosquito, and severe epidemics result therefrom.

The French have adopted active measures to combat sickness and disease and to raise the standard of public health: public services have been improved and extended (pp. 181-184), the Pasteur Institute in Tunis has played a vital part (p. 184), and devoted service has been given by religious and other bodies. The measure of this success is shown by the vital statistics (p. 194).

Prevalent Diseases

Few reliable statistics are available regarding birth-rates and death-rates in Tunisia, except for the city of Tunis: such figures as

are published are given on p. 194, and these indicate that the rates are very high compared with those for countries in western Europe. The infantile mortality rates are almost three times higher, though these are fairly typical of other cities in Barbary and Egypt. The published information regarding the causes of death is very fragmentary, even in the city of Tunis. The *Statistique générale de la Tunisie* ascribes some five-sixths of the total deaths in the city to ordinary diseases, the remainder being due to infectious diseases. The death-rates per 100,000 population caused by infectious diseases during four recent years in Tunis were:

	1935	1936	1937	1938
Typhoid and paratyphoid fever	20.5	16.4	31.0	33.3
Typhus fever	1.4	3.2	5.5	17.8
Measles	1.8	99.4	71.1	5.9
Scarlet fever	2.7	1.4	0.0	0.0
Whooping-cough	13.2	11.4	20.5	16.0
Diphtheria	7.8	15.0	9.6	2.7
Influenza		31.5	30.6	27.4
Tuberculosis of respiratory system	191.1	139.5	194.7	203.9
Tuberculosis: other forms	36.0	48.4	55.6	57.9
Malaria	17.8	10.5	10.9	6.8
Pneumonia and broncho-pneumonia		248.1	191.5	225.3
Diarrhoea and enteritis under 2 years of age (total deaths)	615	577	803	697

DISEASES AND PESTS

MALARIA

MALARIA ranks first in importance among the diseases of Tunisia. It is endemic throughout the country, varying in intensity in different regions and from year to year. Various types of malaria are caused by the presence in the human blood-stream of one or more species of the organism *Plasmodium*; it is conveyed to man by the bite of already infected *Anopheles* mosquitoes. Periodically severe epidemics occur: that of 1932 and 1933 affected most of the country. A special anti-malaria organization was created as part of the Office of Social Hygiene and Preventive Medicine in 1932, and since that date a considerable amount of information has been published regarding the epidemiology of the disease.

Malaria is very common in the neighbourhood of river valleys, lakes, and chotts: the main areas affected are shown in Fig. 27,

though drainage and land reclamation undertaken in recent years has probably reduced the incidence of malaria in some of the districts

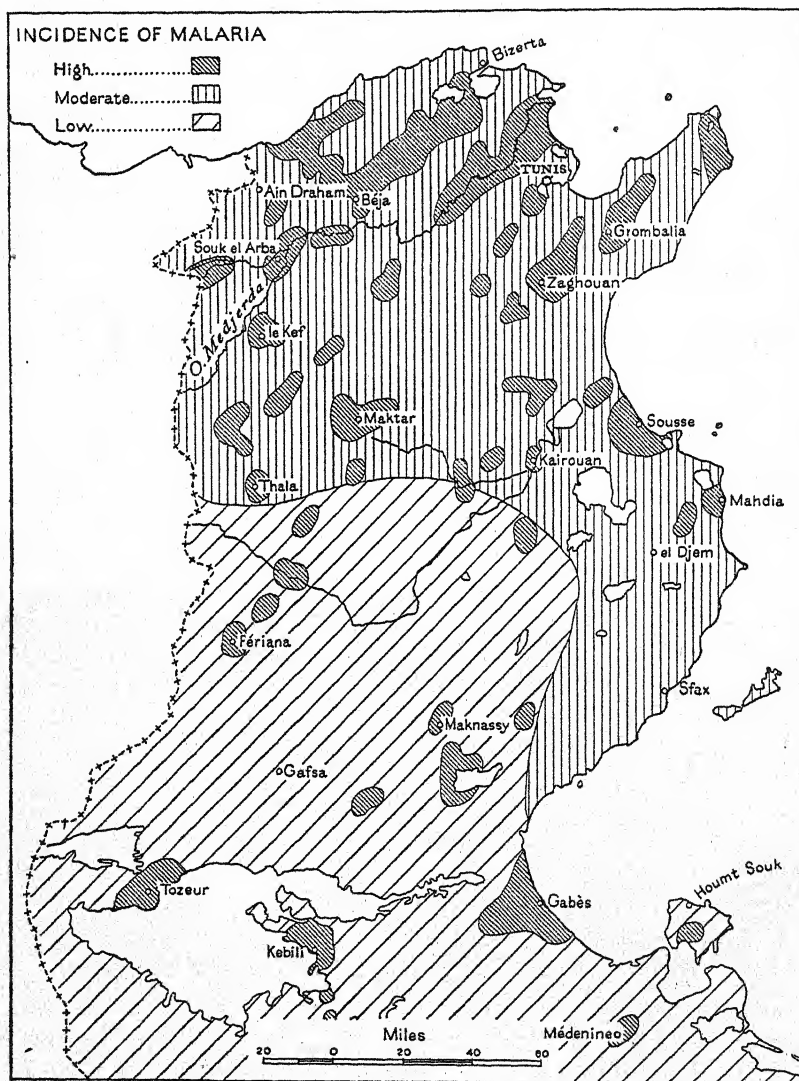


FIG. 27. *The incidence of malaria*

shown in this map, notably in the north-west. In the north, the most humid part of Tunisia, there is a relationship between rainfall and density of the anopheles mosquitoes, and consequently the prevalence

of malaria. The northern Tell is for the most part highly malarious, as is the Cap Bon peninsula, but in the Lower Tell malaria is less prevalent. Hammamet and Zaghouan have normally very little malaria, though the latter suffered from the epidemic of 1932. The Sahel of Sousse is very malarious; near the large sebkhas anopheles are excessively prevalent, and Kairouan is possibly the most malarious place in Tunisia. Malaria is prevalent in southern Tunisia in the neighbourhood of the chotts, but information is scanty.

The 3,000 or 4,000 cases of malaria notified annually by the Health Department have no significance as an index of the prevalence of the disease. It is certain that malaria makes a very high indirect contribution to the high mortality rates, and that it is a leading cause of infant mortality. Krough reported in 1933 that 50 per cent. of the infants under one year examined by him harboured malaria parasites. Nomads, the most poverty-stricken people in Tunisia, play an important part in the dissemination of strains of malaria parasites, as they do in the spread of other infections.

The three forms of malaria, benign tertian, malignant tertian or subtertian, and quartan, caused by *Plasmodium vivax*, *P. falciparum*, and *P. malariae* respectively, occur in Tunisia. In the Cap Bon peninsula *P. malariae* infections are relatively most numerous in the winter months. These quartan infections remain at a fairly constant level throughout the year. In the spring months *P. vivax* infections predominate: in the summer and autumn *P. falciparum* infections are most numerous. This seasonal rhythm of infections is fairly constant, though the relative frequency of the species is subject to variation from place to place. *P. malariae* infections are frequent in some localities, but rare in others not far distant.

Bauge reported in 1942 on the frequency of mixed malaria infections in northern and southern Tunisia. His findings were based on the examination of 15,606 blood films at Souk el Arba in the Medjerda valley, and of 8,531 in Tozeur on the shores of the Chott Djerid. In Souk el Arba mixed infections were found in 78 patients; a triple infection in 3, *P. falciparum* and *P. vivax* in 48, *P. vivax* and *P. malariae* in 22, and *P. falciparum* and *P. malariae* in 5. In Tozeur there were 30 mixed infections: 1 triple infection, 13 *vivax-malariae*, 9 *falciparum-vivax*, and 7 *falciparum-malariae* infections. More than one-third of these mixed infections were found in children under the age of 10. Clinically they were more severe than single infections.

Anopheles Mosquitoes

As in northern Algeria, *Anopheles maculipennis* var. *labranchiae* is the dominant species throughout Tunisia as far south as the chotts, and is much the most important vector of malaria. This mosquito breeds in a variety of waters, but especially in swamps and slowly moving weedy rivers and streams, in wide shallow wells, and in irrigation ditches. It does not breed in large stretches of open water where there is wave action. Abandoned wells or modern wells fitted with wind-pumps are more dangerous than wells of the Arab type in which the water is frequently and violently disturbed by buckets. In northern Tunisia this mosquito breeds almost exclusively in fresh water, but in the south it has been found breeding in waters with a high saline content. The breeding season extends from April to November, during which time several generations are reared. In the cold months when breeding is suspended adult female mosquitoes take refuge in dwellings or stables, where they continue to feed periodically and to transmit malaria. Very large numbers of such semi-hibernating adult female *A. maculipennis*, mostly gorged with blood, have been found in the winter in native houses in the malarious Sahel of Sousse.

Anopheles hispaniola has been reported from the High Tell, the Sahel, the Cap Bon peninsula, and some of the oases in the south. It generally breeds in the beds of streams. It has very rarely been found in human habitations in Tunisia where it appears to play little, if any, part in the transmission of malaria.

Anopheles algeriensis has been found in the northern Tell, the Cap Bon peninsula, around le Krib (south-west of TebourSouk), and at Kebili. It is a relatively rare species, which seldom enters houses and is not regarded as a transmitter of malaria of much importance: it may, however, be a vector of quartan malaria. It generally breeds in swamps and is most in evidence in the winter.

Anopheles sergenti and *A. multicolor* are important vectors of malaria in southern Tunisia. The former breeds in fresh water, and the latter in brackish or even salt water.

Anopheles superpictus, a vector of malaria in some eastern Mediterranean countries, has been reported from Tunisia but appears to be very rare.

According to Wassilieff (1938) anopheles can be found breeding at all seasons of the year in parts of Tunisia. Anti-larval measures should, therefore, be carried out without intermission, though the measures should be modified from time to time in accordance with

biological observations. For example, floods following heavy rain clear the oeds of larvae which may be carried far afield to ditches, ravines, or any low-lying ground: these temporary breeding-grounds then call for the larvicide treatment previously given to the water-course. Air photographs have been of value in indicating patches of water left by floods that need attention. Permanent breeding-places, notably in the oases, might be eliminated by persistent anti-larval measures: in most cases such breeding-places are not numerous and are very far removed from any other anopheline breeding-grounds. *Gambusia*, the mosquito larva-eating fish, have been found to be most effective in suitable localities for the suppression of anophelines. To obtain the best results with *Gambusia* it is necessary to keep the water free from too dense an algal growth and from other obstacles such as dead rushes, which may prevent the fish obtaining access to larvae. During floods, when no larvae are found in water-courses, adult anophelines may be found in great numbers in houses bordering the streams. An attack on such adult mosquitoes with insecticidal sprays has given good results.

Extensive trials at controlling malaria by the mass distribution of anti-malaria drugs have been reported. In the Cap Bon peninsula 27,097 persons (including 10,021 children of 12 years and under) were treated in 1936, 27,126 in 1937, and 26,906 in 1938. Premaline tablets were used, each tablet containing quinacrine 0.10 gramme, rhodoquine 0.005 gramme, and praequine 0.005 gramme. The distribution, on which a staff of twenty-one nurses was employed, was made from 1 June to 15 November of each year. The tablets were given at 10-day intervals during the first month, and thereafter twice a month. In 1936 the cost was 20 francs a head. The percentage of persons in whose blood malaria parasites were found was 21.9 per cent. for children and 17.6 per cent. for adults in May 1936. The rates at the end of 1938 were only 1.8 and 0.1 per cent. respectively. A correspondingly remarkable decline in the spleen rates was also observed.

TYPHUS FEVER

Epidemic typhus fever is an acute febrile disease caused by a minute organism, *Rickettsia prowazeki*. Infection is conveyed from man to man by lice. It is endemic in all north African countries, and in Tunisia there has been a marked increase in prevalence during recent years. It is impossible to say what proportion the

number of notified cases bears to the actual incidence, but the following figures of notified cases since 1931 illustrate the endemic trend:

1931 . . .	335	1935 . . .	949	1939 . . .	6,212
1932 . . .	318	1936 . . .	841	1940 . . .	..
1933 . . .	344	1937 . . .	3,778	1941 . . .	7,171
1934 . . .	782	1938 . . .	2,376	1942 . . .	12,443

This remarkable increase in prevalence has been due not to localized epidemic outbreaks but rather to persistent increase in endemicity. Almost all parts of Tunisia have been affected. The number of cases notified in each civil control between November 1941 and February 1942, expressed as rates per 100,000 inhabitants, were:

Béja . . .	860	Le Kef . . .	970	Teboursouk . .	874
Bizerta . .	198	Maktar . . .	722	Thala . . .	1,292
Djerba . .	15	Medjez el Bab .	829	Tozeur . . .	315
Gabès . . .	345	Sfax . . .	604	Tunis . . .	559
Gafsa . . .	878	Souk el Arba .	1,533	Zaghuan . .	367
Grombalia .	495	Sousse . . .	801		
Kairouan . .	220	Tabarka . . .	622	Tunisia (Total)	664

Each year the seasonal prevalence is constant. The maximum incidence is in May, the lowest in September and October.

Typhus epidemics only occur in conditions of economic stress, misery, and overcrowding, in which facilities for personal cleanliness are non-existent. They are often the accompaniment or aftermath of catastrophes such as famine, war, and earthquake. Refugees huddled together in insanitary conditions are especially prone to attack, and under such conditions the ubiquitous louse multiplies exceedingly. Scarcity of food lowers the resistance of the body to infection. In north Africa the nomad plays an important role in spreading infection. The causes of the uniform increase in the endemicity of typhus fever in north Africa are, however, not at all clear. It has been suggested that a rupture of the immunity balance by unfavourable economic and nutritional conditions in a chronically infected population may have been responsible.

Measures to eradicate or control typhus fever are directed mainly against the louse. Numerous methods of protective inoculation have been employed in recent years, but opinion is not unanimous as to their value in combating epidemics. In Tunisia favourable reports have been published of the results of inoculating contacts of typhus cases with a living virus in observation camps.

RELAPSING FEVER

Relapsing fever is a disease in which the infecting spirochaete is conveyed directly from man to man by the louse. No case of louse-borne relapsing fever has been reported from Tunisia in recent years. The absence of the disease from a country in which typhus fever is so prevalent is somewhat surprising: sporadic cases may have been overlooked, but it is unlikely that an epidemic manifestation would escape recognition. The few cases of relapsing fever reported in recent years have been of the tick-borne variety: this is an infection of rats and wild rodents, and the infection of man is merely incidental. In 1941 five patients with relapsing fever spirochaetes in their blood were discovered during the routine examination of blood smears from febrile patients in the Bizerta district, but none of these patients harboured lice. The tick *Ornithodoros erraticus*, which in Spain and north Africa transmits *Spirochaeta hispanica*, was found in burrows in the district. Cross-immunity tests showed, however, that the strain of spirochaete responsible for these Tunisian cases was neither *S. hispanica* nor *S. duttoni*, the cause of the tick fever of tropical Africa.

LEISHMANIASIS

There are two types of leishmaniasis in Tunisia, visceral and dermal. These are very dissimilar diseases, though the causative parasites are similar and infection in both is transmitted by sand-flies, *Phlebotomus*.

Visceral leishmaniasis, or kala azar, was first noted in Tunisia in 1906, since when only 131 cases had been recorded up to the end of 1937. Nearly all these cases occurred in the northern half of Tunisia, and in two-thirds of the cases the patients were Italians: native Moslems and Jews appear to be less susceptible. Most of the victims are children. In the Mediterranean form of kala azar dogs act as reservoirs of the parasite *Leishmania donovani*, which is transmitted by the sand-fly *Phlebotomus papatasi*. Two other species of the sand-fly, *P. sergenti* and *P. perniciosus*, are also widely distributed throughout Tunisia.

Dermal leishmaniasis, caused by *Leishmania tropica*, may cause skin ulceration that is slow to heal and may leave disfiguring scars: otherwise it is not a serious complaint. It is commonly known as oriental sore, but has many synonyms in the different regions in

which it prevails: in Tunisia it is sometimes known as *bouton de Gafsa*. Occasional cases have been reported from Gafsa and Gabès, but the disease does not appear to be very prevalent.

PLAGUE

Bubonic plague is primarily a disease of rats and some other rodents. It is caused by a bacillus, infection with which is conveyed from rodent to rodent by their fleas. Infection is also conveyed from rodent to man by the same means. There is also a pneumonic form of the disease in man. Primary pneumonic plague is very highly infectious; all contact with patients is dangerous unless elaborate precautions be taken to avoid the inspiration of air contaminated by excretion from the patients' respiratory passages. Outbreaks of primary pneumonic plague generally arise from a secondary pneumonia developing during the terminal stages of a case of bubonic plague. Observers in north Africa state that bubonic plague infection can be, and occasionally is, conveyed directly from man to man by the flea or other human ectoparasite, but generally speaking human plague is but incidental to a coexisting rodent epizootic. No rodent comes into such intimate contact with man as does the rat: this explains the important role played by the rat in the spread of plague. In many parts of the world, however, plague infection is kept alive among a great variety of wild rodents, during inter-epidemic periods.

The ports of Tunisia, in common with most Mediterranean ports, were repeatedly infected with ship-borne plague during the first two decades of the present century. During the twenty years ending in 1929 there were 1,149 cases of plague notified in Tunisia with 521 deaths, a relatively low case mortality rate. Of recent years the disease has been little in evidence, though infection persists among the rats of Tunis. There were 7 notified cases in 1936, 3 in 1937, and 5 in 1938.

In the interior plague infection has been found among wild rodents other than rats, though not since 1932. This wild rodent infection was thought to have been introduced from Libya across the land frontier: ship-borne plague has shown little tendency to spread inland. *Psammomys* is the dominant wild rodent of southern Tunisia, and is very susceptible to plague infection. *Meriones* are more prevalent in central and northern Tunisia: they are less readily infected with plague. The greatest danger of this rural or sylvatic plague, as it is called, is that in areas adjacent to towns the rodents

may come into contact with urban rats. The periodic destruction of rodents in burrows near human habitations is, therefore, a wise precaution. In the city of Tunis arrangements are made for the systematic capture and examination of rats.

INTESTINAL INFECTIONS

Notified cases of intestinal infections during the period 1936-1938 included:

	1936	1937	1938
Typhoid and paratyphoid fever	396	771	484
Dysentery	160	156	233

Cases of typhoid and paratyphoid fever were notified in all months of the year, but were slightly more numerous in the last four and the first two months than at other times. Dysentery notifications were much more numerous during the second half of the year.

It is evident that the above figures give no indication of the real prevalence of the disease. The typhoid and paratyphoid death-rate of the city of Tunis alone in 1938 was 33.3 per 100,000 (73 deaths in a population of nearly 220,000). Assuming that the case mortality rate of these enteric fevers was as high as 20 per cent., at least 365 cases must have occurred in Tunis alone, yet the recorded total for the whole country was only 484.

Contaminated water-supplies must play an important part in the spread of intestinal infections. In view of the low hygienic standards of the population, all untreated waters should be regarded as suspect and should be sterilized before being used for drinking or in the preparation of food. Uncooked vegetables, such as salads of unknown origin, and aerated waters manufactured without adequate supervision should be avoided.

Several reports refer to shellfish as having been responsible for enteric infections in Tunisia. Shellfish from French sources obtained in the market at Ferryville, French shellfish purified in purification beds north of Bizerta, and shellfish from the Lac de Bizerte have all been investigated, and a very high proportion was found to be contaminated with intestinal organisms. During a period of two and a half years the study of 74 enteric infections in Bizerta and Ferryville showed that in 38 the consumption of shell-fish was responsible and that in 23 the water from shellfish pits at Ferryville was incriminated.

Diarrhoea and enteritis are important causes of infant mortality. In the city of Tunis during the years 1935-1938 the numbers of deaths of children under 2 years of age ascribed to diarrhoea and enteritis were 615, 577, 803, and 697 respectively.

In rural areas the habitual contamination of the soil with human excrement and the excessive prevalence of the house-fly everywhere are sufficient to explain excessive and widespread intestinal infections.

SCHISTOSOMIASIS

Schistosomiasis or bilharziosis is a disease caused by the invasion of the body by a small trematode worm. In the urinary form of the disease the parasite *Schistosoma haematobium* is localized in the tissue of the urinary bladder. Beyond the passage of blood-stained urine the victim may suffer little inconvenience, but complicated cases may be most distressing. In the intestinal form of the disease the parasite *Schistosoma mansoni* lives in the wall of the lower intestine and may give rise to dysenteric symptoms. The eggs of the worm leave the body with urine or faeces. If these eggs be deposited in water containing certain species of fresh-water snail, the early stages of the parasite's development take place in the body of the snail. The worm, on leaving the snail, may penetrate the skin of a person coming into contact with infected water and then make its way to the bladder or rectum as the case may be.

In Tunisia the rectal form of the disease, *Schistosoma mansoni*, is very rare, but infections with *Schistosoma haematobium* are extremely prevalent in localized areas in the south. A massive infection has been reported in three small villages, Zaouiet el Arab, Zorgane, and Ouled Madjed in the oasis of el Oudiane. The inhabitants are all poor people, who live in close contact with water heavily infected with a snail, *Bullinus contortus*. Of the adult population, 86 per cent. of the males and 55 per cent. of the females were infected: of the children (15 years and under), 80 per cent. of the boys and 73 per cent. of the girls were infected. There seems to have been no change in the geographical distribution of the disease since it was first described in 1908.

OTHER HELMINTHIC DISEASES

The hook-worm *Ankylostoma duodenale* is widely distributed in marshy, insanitary places in southern Tunisia. Hook-worm eggs were found in 82 of 300 faecal samples examined in Gabès. In Gafsa

the incidence was lower. Infections have also been reported from the oases of Tozeur and Nefta. In such hot and moist places the inhabitants walking unshod on ground fouled with human excrement can hardly avoid infection, but clinically severe forms of ankylostomiasis do not appear to be common.

The round worms *Ascaris lumbricoides* and *Trichuris trichiura* are very common.

Hydatid disease, caused by infection with a tape-worm *Taenia echinococcus*, occurs among nomadic and semi-nomadic persons who live in close contact with their dogs, which are often fed on the viscera of infected sheep.

A case of human infection with the large liver fluke *Fasciola hepatica* has been reported from Tunisia, a rare occurrence. This parasite is very common in the sheep and cattle of Tunisia, and eating water-cress contaminated with the cercariae of the fluke is a possible means of human infection.

TRACHOMA

Trachoma is widely prevalent, the incidence of the disease increasing from north to south. In the north about 10 per cent. of the population of the Kroumirie, Bizerta, and le Sers (20 miles south-east of le Kef) were found to be infected, and nearly 100 per cent. in the oases of Gafsa, Gabès, and Tozeur. Infection seems to be nearly always acquired during early infancy. In twenty-two rural and urban schools in southern Tunisia with more than 5,000 trachomatous children, there were several hundred healthy French children who had remained free from infection during school-life in classes composed of from 60 to 80 per cent. of trachomatous children. The only French children infected were those who had spent their babyhood in endemic surroundings, and had acquired infection before reaching school age. In the oases of Gafsa the incidence of trachoma was 36.5 per cent. in the French schools and 84.5 per cent. in the Franco-Arab schools. In the Tozeur oases the corresponding figures were 94 and 97.4 per cent.

The above figures indicate the importance of trachoma as a public health problem. Even in Tunis trachoma patients form more than half the total attendances in the ophthalmological department of the Sadiki hospital. There are numerous clinics for the treatment of the disease, and travelling units visit outlying districts.

TUBERCULOSIS

Tuberculosis ranks high among the causes of death in Tunisia. The death-rates per 100,000 inhabitants ascribed to tuberculosis of the respiratory tract in the city of Tunis during the period 1935-1938 were 191, 139, 195, and 204 respectively, and to other forms of tuberculosis 36, 48, 56, and 58. Thus tuberculosis is responsible for about one-tenth of the total deaths. These rates are high even for north African towns: the pulmonary tuberculosis rates are nearly three times higher than those of London, and the deaths ascribed to non-pulmonary tuberculosis are even higher in proportion. Poverty, underfeeding, and overcrowding are largely responsible for the dissemination of the disease. In Tunis the incidence of tuberculosis among the Jews is much lower than among other sections of the population. From 12,000 to 15,000 indigent Jews in the city and its suburbs are entitled to free medical treatment, and reliable information is available as to the causes of death among them: tuberculosis was relatively infrequent and the disease was comparatively mild.

UNDULANT FEVER

Undulant fever, of the type that was formerly designated Malta fever, is a febrile disease of long duration but with a low fatality rate. It is a disease of goats and sheep, and a large proportion of Tunisian goats are infected. Human infections result from drinking the milk or eating the milk products from infected stock, or from close contact with infected animals or their carcasses. Cases of undulant fever are notified each year, but their numbers are small: there were 16 cases in 1936, 23 in 1937, and 7 in 1938. The diagnosis of the condition may be impossible without recourse to laboratory investigation, and it is probable that many cases are overlooked. This frequently happens in countries in which both malaria and undulant fever occur. The disease is believed to have been introduced to Tunisia by immigrants from Malta.

ACUTE INFECTIOUS DISEASES

All the infectious diseases common in Europe occur in Tunisia, the notified cases in recent years including the following:

	1936	1937	1938
Measles	179	136	11
Scarlet fever	159	65	24
Diphtheria	179	160	168
Cerebrospinal meningitis	32	25	18

Whooping-cough is common and widespread, and is said to be a very serious disease in rural areas owing to the frequency of pulmonary complications. Both whooping-cough and measles are important causes of infant mortality in the city of Tunis. A considerable epidemic of diphtheria of a mild type was reported among the military and civil population of Fom Tatahouine in 1934-1935.

RABIES

Rabies is widespread in Tunisia. In 1931 the Pasteur Institute of Tunis inaugurated an animal vaccination service, and up to 1940, 3,612 dogs had received a prophylactic dose of rabies vaccine, 1,377 of them being also revaccinated. No case of rabies occurred among the animals so treated. A certain number of dogs also received curative treatment with success. The number of persons bitten by rabid or suspected animals applying for prophylactic treatment increases each year.

VENEREAL DISEASES

Syphilis and gonorrhoea, which are nearly world-wide, are very prevalent in Tunisia, particularly the former. As facilities for the active treatment of syphilis are not widely available, its more horrible manifestations, now rarely seen in European countries, are still not uncommon. One of the five sections of the Office of Social Hygiene and Preventive Medicine deals with venereal diseases.

PESTS AND VENOMOUS ANIMALS

MOST of the insects of medical interest have already been described in connexion with the diseases which they transmit, and reference should be made to the appropriate sections above.

Lice

Body lice are very prevalent among the natives, who wear many garments and wash and change them seldom. The native Jews are generally cleaner. Head lice and pubic lice are reported to be rare, because of the custom of shaving these parts of the body.

Myiasis

There is a large grey fly, *Wohlfahrtia magnifica*, which deposits its maggots in wounds and cuts on men or animals. The maggots destroy the tissues with great rapidity and spread sepsis. This insect may

cause serious and rapidly increasing injury. The larvae may readily be destroyed, in the tissues, by free irrigation with chloroform water, or by instilling chloroform dissolved in liquid paraffin. This is far more efficacious than swabbing with alcohol or iodine.

Mites

The itch mite (*Sarcoptes*), the cause of scabies, is doubtless very common, and a related species, a small mite, *Pediculoides*, occurs in barley and straw. It attacks the human skin and causes serious eruptions in people handling such materials. It is common in many sub-tropical lands, and appears to be particularly troublesome in Tunisia.

Scorpions

Deaths from the sting of scorpions occur every year, especially in southern Tunisia. Persons are generally stung when lying on the floor indoors, in the hot season.

The black spider, *Latrodectus*, almost certainly occurs in Tunisia. Its bite may cause intense pain and loss of consciousness. The rigid board-like abdomen has sometimes been mistaken for that due to peritonitis.

Snakes

Venomous snakes occur throughout Tunisia, and precautions should be taken to avoid them especially in warm weather: they are unlikely to be met during the winter months, unless disturbed by digging or the clearing out of old houses, ruins, water-holes, or vegetation. In warm weather, when they are active, they may be found in the surroundings indicated, but vipers are also likely to lie on bare rock or in sand. Owing to the colouring of the upper parts of the body they are usually extremely difficult to see, since they may lie motionless for many hours. In soft sand their tracks are obvious, either as continuous shallow trails or as a series of parallel lines in echelon. Where the trail ends the snake may be found either coiled on a rock, usually out of the wind, or concealed in the sand. In chilly weather, especially at night, snakes may enter tents and bedding or other material on the ground, to find warmth.

It is unwise to go barefoot when snakes are likely to be encountered, or to pry into vegetation, rubble, &c., with bare hands and arms. Ankle boots and anklets, puttees or knee-length boots are a reasonable protection against attack.

There is an element of chance in meeting snakes, even where they are known to be common: none may be seen for many weeks or several may appear in a day. Reasonable precautions should become instinctive. It is unusual for snakes to attack unless provoked or frightened. They cannot be relied upon to hiss before they strike, as is commonly supposed.

The treatment for snake-bite is as follows:

1. A tourniquet, preferably of rubber, should be *immediately* applied as tightly as possible above the fang puncture to delay absorption of the venom.
2. A deep incision should be made into the fang punctures, and bleeding encouraged by suction in an endeavour to wash out the venom.
3. The patient must be kept at rest, as exercise may lead to exhaustion.
4. If anti-venom serum be available, it should be injected in the region of the fang punctures, and also intravenously, within a few minutes of the patient being bitten; otherwise it is useless.
5. The application of potassium permanganate crystals or solution is *not* advised nowadays.

HINTS ON TRAVELLING

Travel in northern Tunisia does not differ appreciably from travel in southern Europe and does not, therefore, need special consideration. Conditions in the south and, to some extent, in central Tunisia are, however, exceptional, and the following account is concerned only with the arid areas, with special emphasis on the maintenance of health.

The best months for travel in these areas are during the cooler part of the year from October to April, and particularly in December, January, and February, although rainstorms occur (cf. Chapter IV). The days are often hot, but the nights are cool and sometimes very cold. Night travel should be avoided where possible, except on main roads; on little known tracks it should not be attempted even with a guide.

Food

In southern Tunisia supplies of food are available in the oases, but may be scarce. Game may be obtainable in some of the less desolate regions. Diet should be as varied and balanced as possible, with the

main meal, at least in hot weather, in the evening. The mainstays of European diet include tea or coffee, bread (or flour equivalent, including biscuit), preserved fruits or jam, sugar, fresh vegetables when available (or tinned equivalent), bully beef (or other tinned meat), fresh meat from native sources or game when available, tinned milk (fresh goat, camel, or other milk should be boiled), and chocolate (in winter). Dates and other fruits may be had in many oases, where eggs and other fresh supplies may also be bought in small quantities. Europeans can and should do without many of the foods that they regard as essential at home: even an austere diet should be balanced. Few Europeans can accommodate themselves to the meagre native diet and retain health and maximum efficiency. Native food usually consists chiefly of dates, flour, lentils or beans, and milk (in certain circumstances); other foods (including meat on special occasions) are regarded as luxuries. Many European tinned foods are treated with suspicion or dislike by natives: they may become an acquired taste, especially among the well-to-do in settled communities.

Water

Distances between water-points are often considerable, and many of the wells can supply water for only a limited number of men. Some wells are deep, and means of raising water should, therefore, be carried. Much of the water is brackish to highly saline. Water from all sources frequented by man or beast is usually contaminated.

Water is best carried in metal containers. If goat-skins are used the quantities should be increased by at least one-quarter, owing to unavoidable losses and leakage.

Clothing

In view of the considerable ranges of temperature (sometimes from over 100° F. in the day to about 40° F. at night), protection from cold is as important as protection from the sun. Woollen clothes are essential for the night, though light clothing is suitable during the day. The changes of temperature are often sudden, and under-clothing should, therefore, be chosen to protect against chill. During the day, according to the season of the year, aertex or flannel khaki shirts are best, with shorts or trousers, and sandals, boots, or shoes. Socks or stockings should be worn with any form of boot. In thorn and harsh grass country protection of the body, especially of the legs,

is necessary: strong ankle boots and puttees or knee-length boots may be essential, though fatiguing. Boots give a sense of security against snakes and scorpions. For chilly evenings, cold weather, and cold winds, stockings, trousers, pullovers, Balaclava helmets, great-coats, and scarves are useful, and gloves are often needed for driving in the early morning. In intense hot sunshine a loose thick jacket often gives more comfort, by keeping off the sun's rays, than light clothing or nudity.

Pith helmets or broad-brimmed double terai felt hats should be worn for travelling or working in the sun, though turbans are sometimes better since they protect from cold as well as from heat. During sand-storms, a *cheich*, a type of turban made of fine muslin, helps to protect the head. Dark glasses relieve the glare of the sun, Crookes' lenses being excellent. Goggles are essential when driving vehicles. Plenty of warm bedding should be available.

Accommodation

The larger centres in central and southern Tunisia have small hotels (cf. Chapter X), but indoor accommodation is not essential. Tents are generally unnecessary unless a long stay is made in one place, and shelter from wind and sun during the day is essential; they should have a separate fly-sheet. At night they are of little advantage. For a camp of several days, or as shelter from a shower of rain, a light sheet of canvas stretched between two cars is an efficient substitute.

At night, protection may be wanted against dew, creeping insects, and mosquitoes. Stones constitute a problem of hard lying that can be avoided by choosing a camp site with sufficient sand-drift sleeping accommodation, or by making a hollow among the stones to fit the hips. Dew can be kept out by a light canvas valise of the Wolseley pattern, but the canvas cover must extend high enough to be pulled over the head and pillow if necessary. Creeping insects may be avoided by the use of camp beds, though these are awkward and heavy, and more draughty than a well-chosen sand-drift. With a camp bed, a kapok or similar light mattress is almost essential to conserve the warmth of the body on cold nights. Very comfortable beds can be made readily from palm-leaf ribs or from timber with a rope mattress. Additional protection against creeping insects may be obtained by standing the legs of the bed in tins, either empty or filled with water or other liquid. Mosquitoes can be kept off the person by the use of nets and special clothing (cf. p. 125).

Other Hints

In addition to the above hints, the following notes may be useful for those travelling without medical assistance.

1. Disease is likely to be picked up from the natives of the country, and Europeans should, therefore, always live as far as possible from native villages. Camps should preferably be placed up-wind and, if near running water, upstream of them.

2. Drinking during the heat of the day should be kept to a minimum, and all water, however clean it may look, should be chlorinated or boiled before it is drunk or used for cleaning the teeth. Fresh milk or locally prepared mineral waters should not be drunk, and all food must be carefully inspected before being eaten. Native cooks should be made to keep themselves and their cookhouses clean.

3. Gastric troubles, which are very common in Europeans in warm climates, are due to germs which may be swallowed in water, milk, or uncooked food, such as raw fruits or salads. The best treatment is rest (taking only small quantities of clean boiled water for a day or two), warmth, and a dose of castor-oil. Brackish water causes gastric disorders, and has an unpleasant flavour. Such water may, however, seem potable but may cause disorder after a day or two, or with continual use. Tanks, water-skins, or other containers should be well washed out and refilled from a satisfactory source as soon as possible. Poor quality water may with advantage be used in tea or coffee.

4. Celluloid eye-screens or goggles should be used in windy and dusty weather or when travelling in a convoy in a cloud of dust. If the eye be inflamed it should be washed in clean drinking water which has been previously boiled, and to which salt (one teaspoonful to a pint of water) has been added. A corner of a clean handkerchief or the smooth point of a pencil will remove a piece of grit on the eyeball or inside the lid. A drop of castor-oil will often soothe an eye inflamed by dust.

5. Every precaution should be taken to keep bedding dry and to avoid wearing damp clothes any longer than can be helped.

6. Snakes, scorpions, poisonous spiders, and centipedes take refuge in clothing, boots, and bedding, especially at night. Mattresses and other things on the ground must be lifted every morning and evening to see that no insects have crawled underneath. Before clothes and boots are worn, or towels and sponges used, they should be thoroughly shaken. Generally snakes and scorpions are to be expected in the vicinity of water and around oases, though they sometimes maintain themselves in the most arid and unlikely places.

7. Malaria has been described in some detail (pp. 107-111). To avoid the bite of the anopheles mosquito, camps should be placed as far as possible from swamps, rivers, and irrigated lands, and from native villages. Mosquito-nets should be used and tucked in carefully. Legs, arms, and exposed parts of the body must be protected as much as possible, especially during the hours of darkness. In malarious areas 5 grains of quinine, if available, may be taken daily, but in cases of malignant type there is a certain danger of precipitating blackwater fever. 0.1 gramme mepacrine (quinacrine, atabrine, and atabrin are the same) taken daily, without exception, will in nearly every case prevent a clinical attack of malaria, but it cannot prevent infection. Where the principal type is benign tertian, malaria will usually develop when the dose of mepacrine is no longer taken. The dose is an effective suppressive for malignant and benign tertian and for quartan malaria. A case of malaria may be treated with two 0.1 gramme tablets of mepacrine at four-hourly intervals for the first two days: the services of a doctor should invariably be sought.

8. All Europeans should be vaccinated against small-pox and inoculated against typhoid, paratyphoid, and tetanus.

9. The powder DDT is a very powerful insecticide and is valuable for preventing all insect-borne diseases. It is capable of destroying both larvæ and adult mosquitoes. It is usually sprayed as a solution (about 5%) in kerosene, but it can also be used as a powder or mixed in paint. It does not take the place of personal anti-malarial precautions or drug suppression.

10. If possible, the following medical supplies should be taken: aspirin, bismuth, boric acid, calomel, carbolic ointment, cascara sagrada, castor-oil, chlorodyne, cold cream, corrosive sublimate, DDT powder, Dover's powders, iodine, lanoline, lysol, mepacrine, oil of cloves, paregoric mixture (or better, pills of extract of opium), phenacetin, potassium permanganate, quinine (if available), sodium sulphate, yellow ointment (Ung. Hyd. Ox. Flav.), zinc ointment, zinc sulphate, eye lotions or materials for making them, with eye-bath and anti-scorpion and anti-snake venom sera: the sera should be fresh. They are reputed to be useless unless injected immediately after the sting or bite has been inflicted.

CHAPTER VII

HISTORY

THE history of Tunisia is less that of its Berber inhabitants than that of its invaders and of their influence upon the country. It is known that in Palaeolithic times men lived on the steppes in natural or artificial caves, and, judging by the many remains in southern Tunisia and the Sahara, there was considerable Neolithic settlement. As the Berbers originally lived as tribal nomads, their early history is almost impossible to trace. Information is very scanty until the arrival of Phoenician merchants on the eastern shores of Tunisia in the twelfth century B.C.

The Carthaginian Empire

The first permanent settlements were established by Phoenician merchants from the Levantine coast of Syria at suitable points on the Tunisian coast between the eleventh and the ninth century B.C. Hadrumetum (modern Sousse), Utica (Utique), and Hippo Diarrhynchus or Hippou Akra (Bizerta) were among the earliest. Carthage or Kart Hadasht, the 'new town', was a late foundation traditionally made in 814 B.C. by the Phoenician princess Dido immortalized in Virgil's *Aeneid*. By this time the Phoenicians under the stimulus of over-population and the aggression of the Assyrian Empire were beginning to emigrate in large numbers to north Africa and also to Sicily and Spain. Gradually the trading stations were transformed into populous towns. During the eighth century the Greeks, the second maritime people of the Mediterranean, began to follow the example of the Phoenicians. There was bitter rivalry between Greeks and Phoenicians for the control of the islands and coasts of the central and western Mediterranean. The Phoenicians of Tunisia found it necessary to combine under the leadership of Carthage, the largest of their cities, for the defence of their interests in the western Mediterranean. For four hundred years Carthaginian history consists of wars waged in and around Sicily and Sicilian waters, the main object being to maintain the Carthaginian monopoly of trade in the west and to defend Carthaginian ports and towns in Sicily against Greek and, later, Roman attacks.

Carthage, like the Moslem Aghlabite emirate a millennium later (p. 132), thus exploited to the full the remarkable advantage offered to

a strong naval power by the possession of the Tunisian ports controlling the narrows of the central Mediterranean. The resources which maintained a large battle fleet were drawn partly from commerce and partly from the agricultural wealth of Tunisia. Carthage and her subject cities enjoyed a monopoly of the trade of north-west Africa, Spain, and the Atlantic coasts of Europe and Africa. In southern France, Italy, and Sicily they were less fortunate and were gradually excluded by Greeks and Etruscans, except from western Sicily, which remained a Carthaginian preserve till 241 B.C. While her navies were thus engaged, her land forces had brought all the more fertile part of Tunisia under Carthaginian control as far to the south-west as le Kef (Sicca Veneria). The relatively advanced farming science of the eastern Mediterranean was introduced into Tunisia, and the native Berber population was encouraged to till the soil and to cultivate cereals, vines, and olives. When a Greek army invaded Tunisia in 310 B.C. it found the Medjerda and Miliane valleys heavily cultivated and closely settled with towns and villages. At Carthage itself the landed proprietors came to rival in power the commercial classes.

The Carthaginian state consisted of the capital city, Carthage, which was politically supreme and controlled foreign policy and the making of peace and war, the lesser Phoenician towns which had a certain amount of local self-government, and the native Berbers of the hinterland, who formed a subject class, taxed up to a half of their produce. The chief political organs of the State were a Council of 300 and its Committee of thirty, oligarchical bodies which owed little to popular suffrage, and two annual magistrates or *suffetes*, who were very dependent upon the Council and Committee. The sources of revenue were the agricultural tax already mentioned and a heavy levy upon the other Phoenician towns, which was in effect a tax on trade. The total Carthaginian income was about 12,000 talents or £3 millions sterling a year. Thus it was that Carthage could maintain a large navy and army and sustain long wars with the Greeks and, later, the Romans. A strange feature of the Carthaginian State was that its armies were composed of mercenary regiments, though the general officers were Carthaginians. There was no national army, though in times of dire crisis the citizens armed and fought surprisingly well against professional armies. The mercenary troops, consisting of Berbers from Africa, Iberians from Spain, and Celts from Gaul, were efficient but liable to treachery when unwisely treated. The army existed in fact for wars overseas, and the weakness of the State

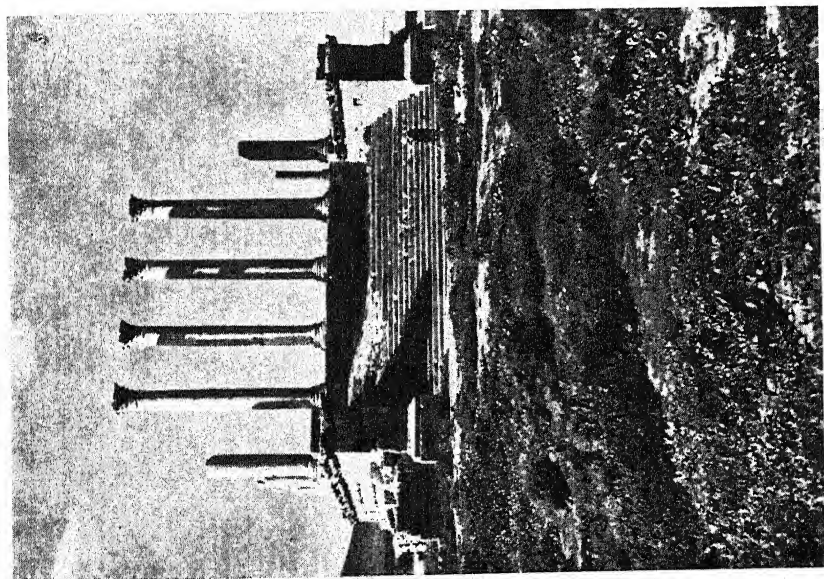
was the weakness of the defence of the homeland once the Carthaginian fleet was defeated or evaded: all depended on sea-power.

This weakness was discovered in the fourth century B.C. by Agathocles, the Greek ruler of Sicilian Syracuse, who when hard pressed by the Carthaginians in Sicily evaded their fleet, threw an army into Tunisia, and nearly succeeded in overthrowing the Carthaginian power (310-307 B.C.). After Agathocles the Carthaginians found a new enemy, the Romans, who, after uniting all Italy into a confederation, were extending their power as 'protectors' into Sicily. The Carthaginians fought two great wars in the third century B.C., the first to save and the second to restore their position in the central Mediterranean. The first (264-241 B.C.) was mainly a naval war and ended with the destruction of their navy and the loss of their bases in Sicily and Sardinia. The second (218-201 B.C.), inspired and led by the great Carthaginian general Hannibal, was an attempt to conquer the sea by the land, by an invasion of Italy made with armies which marched overland from the Spanish territories of Carthage across France and the Alps into Italy. The second war, like the first, ended with complete defeat, yet Carthage was able to recover again because she never lost the basis of her power, her maritime commerce. The third war, deliberately provoked by the Romans and fought solely in Africa, ended in 146 B.C. with the obliteration of the city of Carthage and the massacre of a great part of its inhabitants, though many fled into the interior. The other Phoenician towns survived, though weak and unimportant, but the greater part of the territories of Carthage in Tunisia were made over to the Berber King of Numidia, as the Romans called eastern Algeria. A very small coastal zone was retained to form the first Roman province of Africa with the object of preventing the rise of another maritime power on the Tunisian coast.

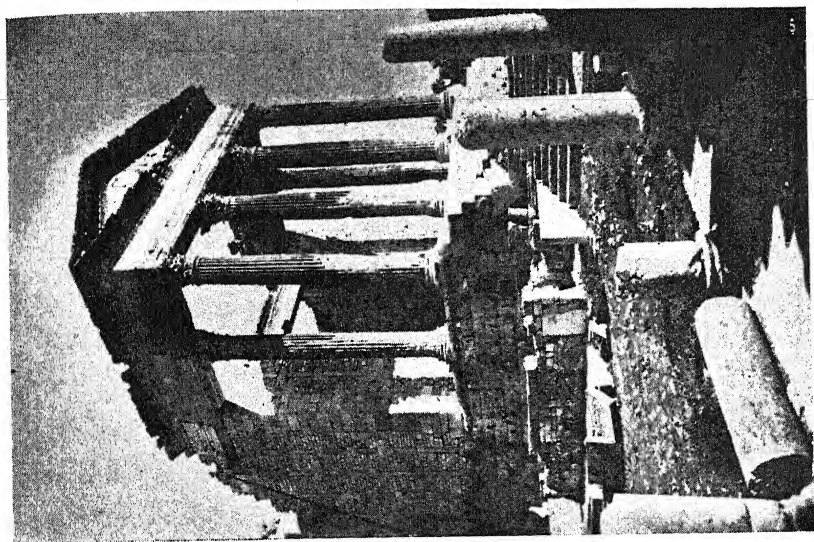
Little remains to-day to mark the city and port of Carthage, which lay about half a mile south of the modern place of that name (Photos. 61-63).

The Romans in Africa (Fig. 28, Appendix C)

Julius Caesar (49-44 B.C.) and Augustus (27 B.C.-A.D. 14), the first Roman emperor, expanded this tiny region into the province of Africa Proconsularis, which embraced the whole of modern Tunisia together with the Bône region of modern Algeria. They also rebuilt the city of Carthage, which became the capital of the enlarged province and grew again to be one of the greatest cities of the Mediterranean world. Under the Roman Empire Africa Proconsularis was



81. *Thuburbo maius: the Capitol*



82. *Dougga: the Capitoline temple*



83. *Zaghouan-Carthage aqueduct*



84. *Zaghouan: the nymphaeum*

very seldom disturbed by wars, and about A.D. 70 the third Roman legion—*legio tertia Augusta*—was moved from its base at Ammaedara (Haidra) into Algeria. Thenceforth administration was entirely in the hands of the civil authorities, the *Proconsul* and his *legati*. The work of government was in fact largely decentralized and made over to the municipal councils and magistrates of the numerous towns. In the four centuries of almost unbroken peace before the Vandal conquest (p. 131) civilization, both urban and agricultural, reached a maximum which has never since been attained. A remarkable network of roads was built, and the villages of the Berber population were gradually transformed from huddles of mud huts (*mapalia*) into well-built towns of stone, with broad arcaded streets, adorned with numerous and generally impressive public buildings—temples, law courts, markets, town squares, and public baths—in the uniform classical style. The transformation was accelerated by the fact that Tunisia became a land of emigration for the peoples of Italy. In particular groups of discharged soldiers were settled as colonists in new towns specially built for them, which served as models for the native population. There are very extensive ruins of towns of the Roman period (Photos. 81-98).

The basis of wealth was the cultivation of cereals and vines in the Tell, and of olives in the steppes and Sahel. The country ranked with Egypt as the granary of Italy, and the stability of the countryside remained undisturbed until the third and fourth centuries A.D. Then a new menace appeared with the adoption of the camel as a riding animal by the nomadic tribesmen of adjoining regions of Algeria and Tripolitania. Thenceforth it was never possible for the small Roman garrison of Tunisia to control the raids of camel nomads or to prevent their settlement within the country.

With the Italians came the Latin tongue and later the Christian faith. The Latin language never conquered the whole country and was mainly urban in its distribution. The nomadic tribesmen of the south continued to speak Berber, and the settled peasantry of the old Carthaginian realm spoke either Berber or Punic, which is a form of Aramaic, the language of Phoenicia. The Christian faith was more successful than the Latin language, and both urban and rural Tunisia became mainly a Christian country, though Jewish proselytism was also successful in the towns and the countryside and particularly among the nomadic tribes of the south. But Christianity was sundered by a fearful schism between the Catholics and the Donatists, the followers of the heretical Donatus. He seems to have espoused a

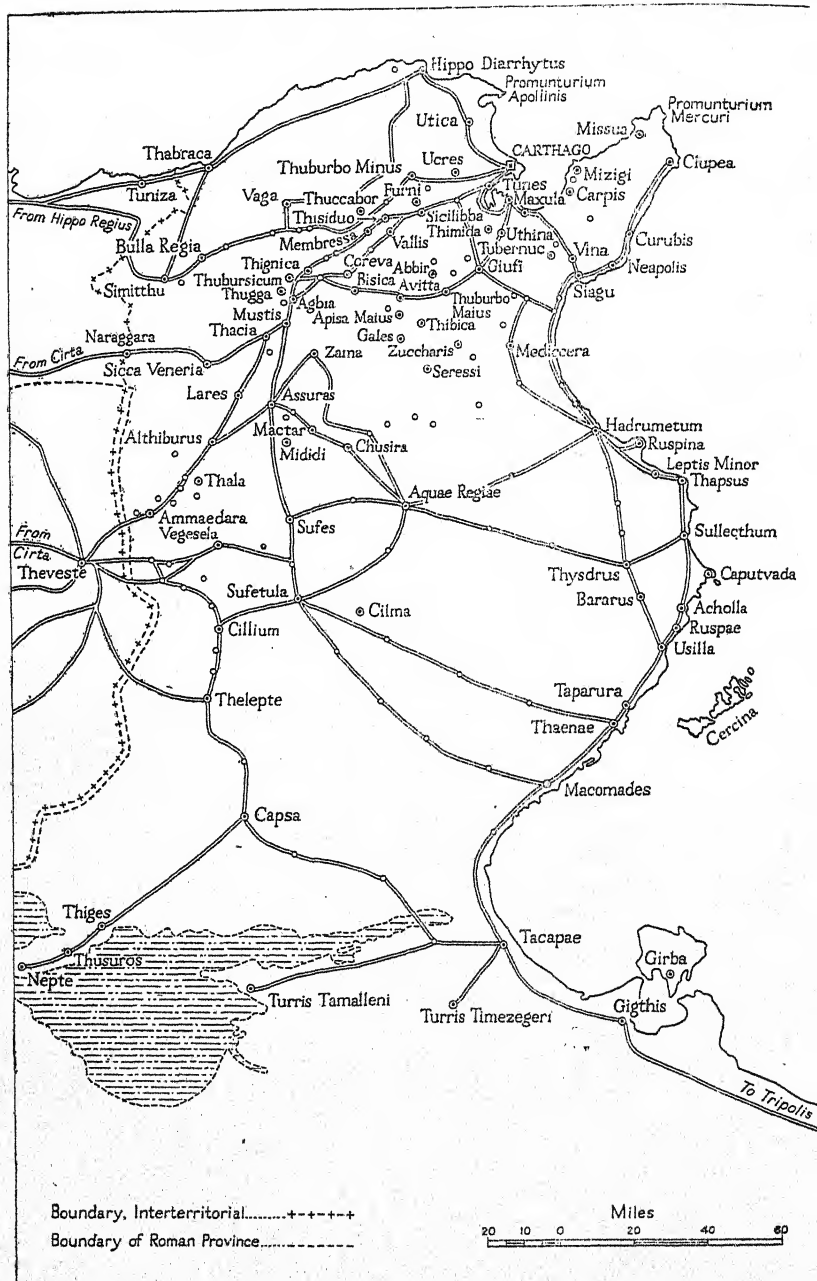


FIG. 28. Roads and towns of the Roman province of Africa Proconsularis

fiercely monotheistic form of Christianity which was influenced in part by the somewhat impersonal religious notions of the Phoenicians and allowed little scope for the humaner thought of the Gospels.

The schism divided the population into mutually intolerant groups, and prepared the way for the Vandal conquest in A.D. 439. At this time the authority of the Roman Empire was everywhere breaking down in western Europe and north Africa under the onslaught of barbarian invaders such as the Vandals, who had already conquered Spain, Morocco, and Algeria. Though Christians, they too were heretical, holding to Arianism, another strongly monotheistic form of belief, and hence were welcomed by the Donatists. Also many of the peasantry, who had been overtaxed in the last two centuries of the Roman Empire, welcomed the Vandals as liberators from the tyranny of the tax collectors. The Vandal conquest did a great deal to ruin Tunisia, as much by the removal of systematic government, the breakdown of public order, and the redistribution of the old farming estates among an ignorant soldiery, as by the pillaging of cities and the massacring of Catholics. Vandal rule lasted till A.D. 533 when the province of Africa and the adjoining province of Numidia were recovered from barbarian hands by an army under the general Belisarius, dispatched from Constantinople by the Eastern or Byzantine Roman Emperor Justinian. For 140 years peace, order, and a certain measure of prosperity were restored. The square fortresses and watch-towers that are so common among the ruins of classical Tunisia date from this period (Photo. 89). All towns were walled, but the decaying prosperity is shown by the narrow compass within which many had shrunk by this time.

The Moslem Conquest

During the seventh century the new Moslem empire which had been established in Syria and Egypt after the rise of Islam began to expand westward. The first Moslem raids into Ifriqiya, as the Moslems called the eastern part of Barbary, took place soon after A.D. 640, but thorough conquest only began after the foundation of Kairouan in 670. Byzantine resistance was finally quelled by Hassan el Ghassani (c. 693-699), who took Carthage and other coastal towns. The Berber tribesmen of southern Tunisia and eastern Algeria rallied under the romantic leadership of a Jewish prophetess, Kahina, but after her death unified resistance ceased. Ifriqiya was organized as a separate province with Kairouan as its capital by Musa ibn Nusayr, who extended its boundary to the Atlantic coast. For 150 years

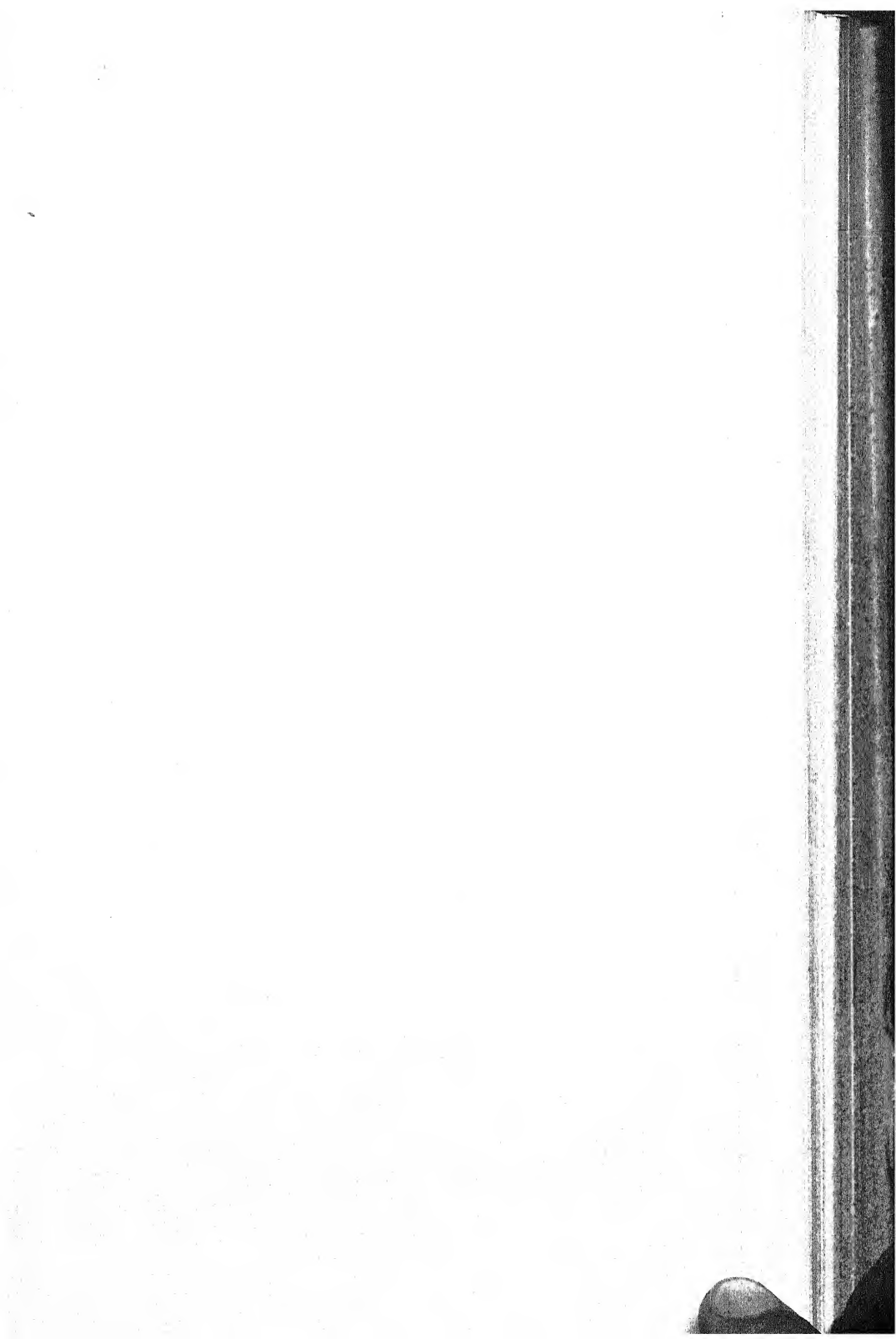
Ifriqiya was ruled by governors who were subordinate first to the Omayyad Caliphs at Damascus and after 750 to the Abbasid Caliphs at Baghdad. There began a slow process by which the Berber peoples of Tunisia gradually accepted Islam as their religion and Arabic as their language in place of Christianity and the Latin, Punic, and Berber tongues. This assimilation appears to have been made comparatively simple by the relatively close connexion between Arabic and Punic (p. 129), and by the existence of a substratum of kindred religious ideas drawn ultimately from Phoenicia and northern Arabia. But Christian and Latin influences maintained some strength till the Hilalian invasion of the eleventh century, which erased from north Africa its classical and Christian tradition. The early Omayyad and Abbasid governors were by no means averse from enjoying the civilization of their subjects, and made no attempt to force conversion upon the non-Arab elements in their dominions.

The Aghlabite Dynasty

About 785 the north African dominions began to be split between independent Moslem dynasties, usually associated with one of the great sects which divided Islam and were supported by different Berber tribes. In Tunisia the first sect to establish itself was the puritan and austere Kharijite, whose followers ravaged the country and twice attacked Kairouan. Their revolts were followed by raids from the warlike tribes of the extreme south, but after these had been quelled the Aghlabite dynasty gave the country a century of peace. In 800 the Caliph of Baghdad appointed Ibrahim ibn Aghlab governor of Kairouan. He followed the example of the Idrisite dynasty which had made itself master of Morocco, and established an independent emirate in Tunisia, though as orthodox Moslems of the Sunni sect he and his successors did not dispute the spiritual authority of the Caliph of Baghdad. The Aghlabites were energetic and made the most of the maritime advantages of Tunisia. With a well-equipped fleet they harried the coasts of France, Italy, and the central Mediterranean islands. Their greatest success was the conquest of Sicily in the times of Ziyadat Allah (817-838) and Ibrahim II (874-902), the two emirs who built the Great Mosque of Kairouan.

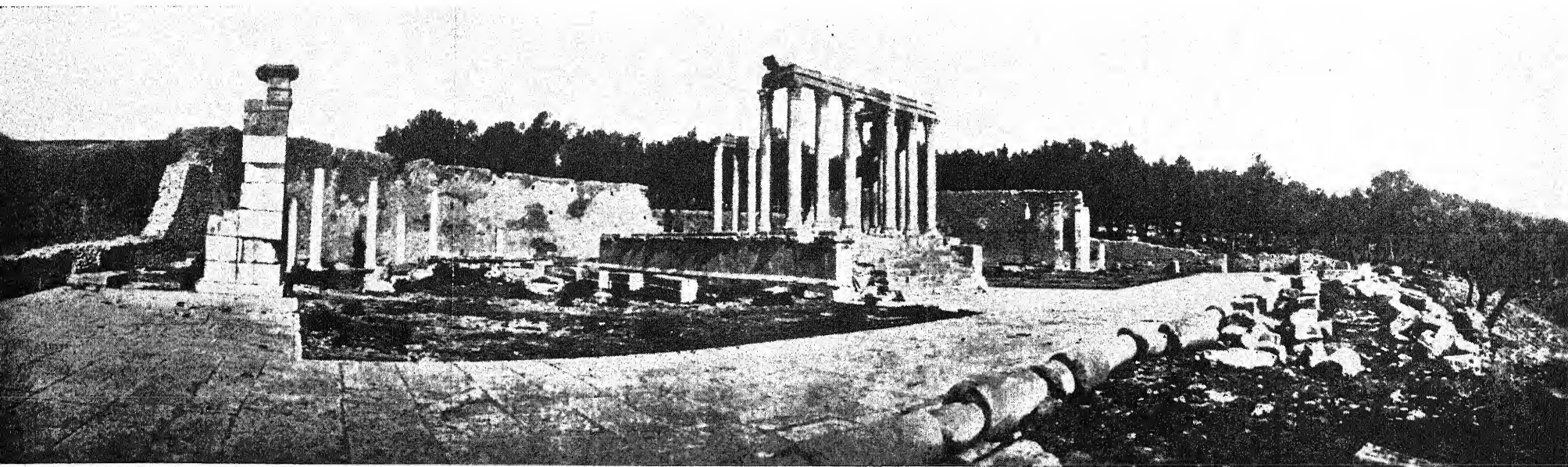
The Fatimites

The last Aghlabite was overthrown by Said ibn Husain, who rallied the adherents of the Shia sect in Tunisia, the great rivals of the Sunnis, and established himself as ruler under the title of Imam





85. *El Djem*



86. *Dougga: the temple of Venus or Dea Caelestis*

Ubaidalla el Mahdi. His claim to the leadership of the Shias enabled him to knit together in one empire all the Moslem lands of north Africa from the Atlantic to the borders of Egypt. He ruled from a new capital on the Tunisian coast which he named Mahdia, thus advertising his claim to be a Mahdi or prophet and the direct descendant of Fatima, the daughter of Mohammed. The Fatimite dynasty which he founded formed an independent Shia Caliphate rivalling the Sunni Caliphate of Baghdad. In 969 its power was extended by the conquest of Egypt, and the seat of the Caliphate was transferred thither from Mahdia to the new city of Qahira, the modern Cairo. Within Tunisia the Fatimites had to contend with the Kharijite sectaries and with revolts of the desert nomads, who were encouraged to resist by the Omayyad dynasty of Spain. When the Fatimites turned eastward to Egypt they left their western dominions under the rule of a governor chosen from the Zirid chiefs of the Sanhadja tribe, which had given them great assistance. In this way the Zirid dynasty was formed, nominally as a viceroyalty of the Fatimite Caliphate: Maghreb—the common Moslem term for Barbary—was split into two kingdoms. The eastern kingdom of Ifriqiya had its capital at Kairouan and enjoyed considerable prosperity until the middle of the eleventh century.

The Hilalian Invasion, and the Almohad and Hafsite Dynasties

In 1049 el Moezz ibn Badis, the ruler of the eastern kingdom, rejected Shiism, the heresy supported by the Fatimites, for the orthodox Sunnite faith, and in revenge the Caliph at Cairo encouraged two warlike tribes of upper Egypt, the Hilal and Soleim, to move westward to Barbary. The Soleims stayed in Tripolitania, but the Hilals moved on into Tunisia, plunging the country into anarchy. The coastal towns were able to maintain their existence, but the Hilals ravaged and occupied the interior plains. The agricultural Berbers fled into the mountains, where they retained from generation to generation their lawless and predatory habits, making order and prosperity almost impossible in the open parts of the country until the effective occupation by the French centuries later. The Normans in Sicily took advantage of the confusion to occupy some of the towns of the east coast, making Mahdia their capital in 1148. The natives appealed for help to the founder of the Almohad dynasty of the west, Abd el Moumen, who drove out the Normans, establishing a kingdom which stretched from Tangier in the west to Tripoli in the east. Until 1236 Tunisia was ruled for the Almohads by governors, but in that year

Abu Zakariya, the ruling governor, broke away and founded a new dynasty, the Hafsite, which existed until the beginning of the sixteenth century. The new kingdom met with many difficulties, both external and internal. At the outset, Louis IV of France led his third crusade against Tunis, though when he died from plague in 1270 his troops retired. They did not, however, leave the country in peace; instead there were continual revolts and tribal quarrels. At the end of the fourteenth century there was a period of comparative calm during which the Hafsites encouraged commerce and the arts of peace, and many Andalusian Moslems, driven out of Spain, settled in Tunis and spread Andalusian culture through the city. But though the Hafsite dynasty in general rose considerably above the usual level of Moslem sovereigns, it could not control the turbulent tribes, and by the beginning of the sixteenth century its rule was effective only in the immediate neighbourhood of Tunis itself. The tribes of the interior were independent, and the towns of the east coast were autonomous and had already begun to turn to piracy.

Spanish Domination

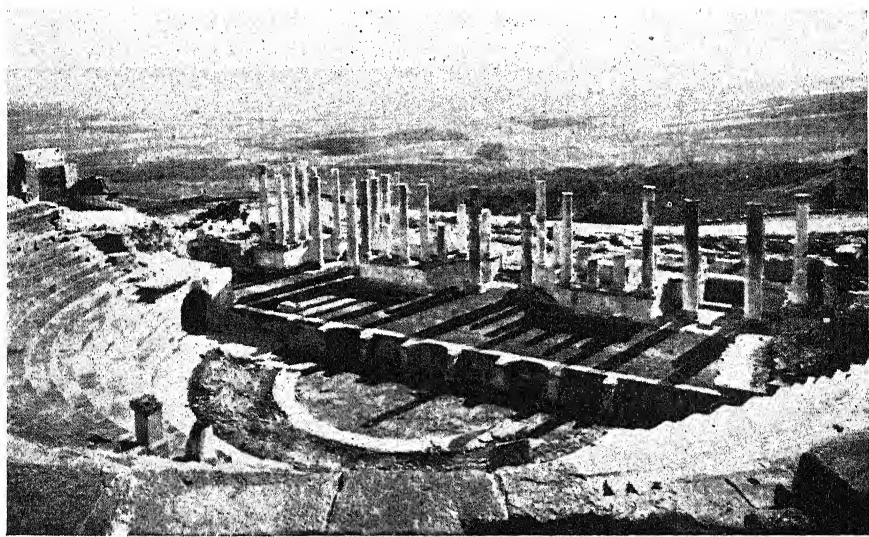
In 1512 Aroudj, a Turkish pirate, established himself on the Île de Djerba off the east coast of Tunisia, and from there he and his brother Khair ed Din (Barbarossa) began to raid the surrounding shores of Europe and Africa. They drove Moulay Hassan, the Hafsite prince in Tunis, from the country in 1534, but soon met with opposition from various European states. Moulay Hassan took refuge in Spain, where he persuaded Charles V to re-establish him in his capital. Charles sailed from Barcelona and captured Tunis in 1535, where he set up Moulay Hassan as his regent: but the Spanish were too occupied elsewhere to maintain effective control in north Africa, and in 1574 Tunis fell to the Turks.

The Turks

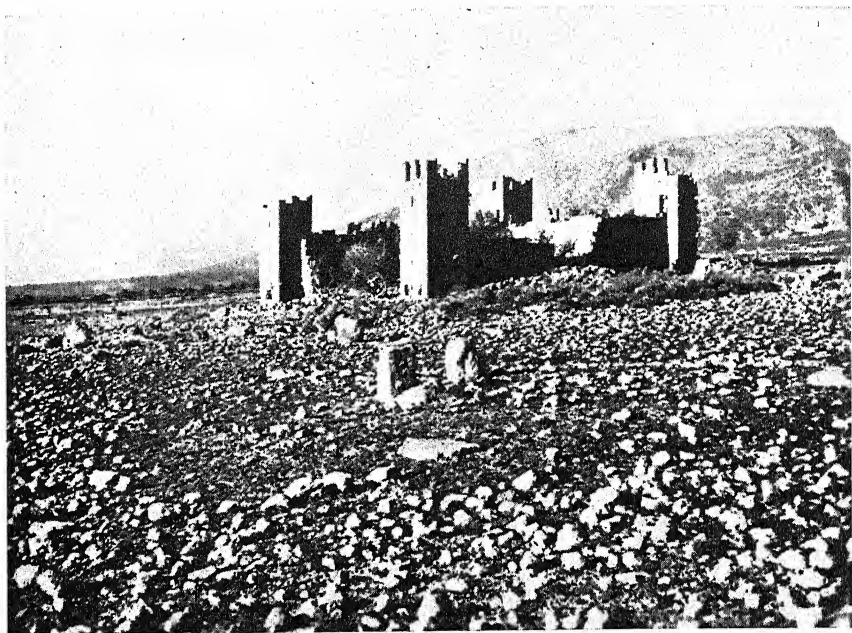
After 1574 Tunisia was a province of the Ottoman Turkish Empire, from which it gradually secured virtual independence. It kept, however, its Ottoman organization, which was essentially military, and depended for its existence on the support of the army. At first the country was governed by a *pasha*, but he had always to consider the wishes of the *divan*, a council of the chief officers of the army, which from 1590 elected a *dey* to represent them. The two dominant political influences at work in the country, usually in opposition to one another, were those of the army and the *rais* or pirate captains.



87. *El Djem: the Roman amphitheatre*



88. *Dougga: the Roman theatre*



89. *Ksar Lemsa: the Byzantine fortress*



90. *Sbeitla: the triple temple and its precinct*

The army's duty was to keep order and collect taxes: the pirates owed their strength to the fact that they provided the bulk of the State's treasure. As the dey had the army behind him, he gradually assumed control, the office of pasha becoming for many years a mere title. The deys Othman and Youssef strengthened the army, putting it under a *bey*, and reduced the power of the rais. In 1631 the deys became pre-eminent and were given the title of pasha, the office being made hereditary at the same time. Their rule was troubled by quarrels over the succession, and by the raids of Algerian tribesmen, which continued until the French conquest of Algeria in the nineteenth century.

The Husseinist Dynasty

The present reigning dynasty in Tunisia was founded in 1705. The Bey, Hussein ben Ali, organized the defence of the country against raids by Algerian tribes, and was then recognized as pasha-bey. His family became the hereditary rulers of the country, and under them Tunisia's relations with Europe were improved and piracy diminished. They instituted many reforms and carried out public works. Hussein ben Ali, who died in 1740, restored Kairouan, constructed many mosques and other buildings, and fostered the development of commerce. Ali Bey (1759-1782) was another ruler who gave the country peace and prosperity. Ahmed Bey (1837-1855) established closer relations with France and abolished slavery and the laws of discrimination against Jews. The deys met, however, with many difficulties, particularly as they neglected the army, without whose support their influence was limited. The mountain districts, the steppes, and the south as a whole remained almost independent, and at times actively revolted against the deys. Simultaneously the financial state of the country was deteriorating: the Bey accepted loans in France at preposterous rates of interest which the country could not afford, and the government proved too weak to collect the taxes to pay for the many reforms which were being introduced too rapidly. Although the dynasty owed nominal allegiance to Turkey, it gradually became more under the influence of France: and when, in 1881, the country was on the verge of bankruptcy, the French decided to intervene in view of their various interests in the country.

The French Protectorate

The main reasons for the establishment of the French protectorate in Tunisia were the need for peace and security in territory adjacent to the colonization areas in Algeria, the weakness of the political and

financial position of the Bey of Tunis, and the ambitions of the Italians in north Africa. France had held a special position in the country since 1560, and owned various fishing and commercial concessions. French predominance was further increased by the occupation of Algeria in the years following 1830; the French consul in Tunis constantly encouraged reforms which the country could not really afford, on the ground that peace in Tunisia was essential for the well-being of Algeria. To meet his country's debts the Bey, Mohammed Saddok (Sidi Sadok) (1859-1882), had to float loans and impose new taxes on a people already exhausted by revolts, cholera, and famine. In 1870 an international financial commission was formed to investigate the affairs of the country, with British, French, and Italian 'controllers'. The English and Italian representatives hoped that this commission would curb the influence of their French colleague, but it had the opposite effect and contributed materially towards the eventual occupation of the country by France. Through the energies of their consul, Roustan, the French obtained various concessions, which were deeply resented by Italy. This led the Italian consul, Maccio, to seek the favour of the Bey, who proved too weak to deal firmly either with the intense Franco-Italian rivalry or with the growing unrest of his people. Eventually in 1881, the pro-Italian attitude of the Bey and the raids on eastern Algeria by the independent Kroumirie tribes living in what is now north-western Tunisia decided the French Government on a policy of armed intervention.

A large force was sent to the country to impress the Tunisians with the power of the French, so that excessive bloodshed might be avoided. One column under General Logerot marched on le Kef from Souk Ahras, and after taking the town continued down the Oued Mellègue to the Medjerda valley and Souk el Arba, the terminus of the railway from Tunis. Another force under General Delebecque assembled at la Calle and marched east to subdue the Kroumirie tribes. With the help of fresh troops landed at Tabarka and Bizerta an advance was made on Tunis, and by 11 May Djedeida was reached. The French consul had tried unsuccessfully to persuade the Bey to capitulate of his own free will and so on 12 May conditions of peace were dictated to him in the palace of Kassar Said. The Treaty of Kassar Said was signed in the evening.

By this treaty, commonly but erroneously known as the Treaty of le Bardo, the Bey remained the nominal head of the country, but a French Resident Minister was to direct all foreign affairs and to act as intermediary between the French and Tunisian authorities: the

French army was to occupy certain frontier and coastal posts (p. 161). The treaty met with general approval in Europe, with the exception of Italy and Turkey.

In Tunisia the tribes gradually submitted. The French Government, misled by the apparent calm of their new Protectorate, withdrew two-thirds of their troops, leaving only 15,000 to maintain order. The Bey declared that he had submitted only under compulsion, and Mustapha ben Ismail, his minister, encouraged revolt by emphasizing the weakness of the French. Rebellion broke out among the tribes of the south and the steppes, and soon spread through the country. It was difficult for the French to organize a new land campaign until the cooler autumn weather: in addition many French deputies were opposed to the plans of the French statesman, Jules Ferry, for a new intervention. Eventually a fleet under Admiral Garnault was sent to cruise along the coast, and to subdue as much of the country as possible. On 14 July it assembled off Sfax, which within two days was in French hands. The ships then moved on to Gabès, where marines landed and occupied the nearby villages of Djara el Kbira and Menzel, and, on 28 July, the Île de Djerba and Zarzis. The fleet then proceeded slowly northward and secured the submission of Mahdia, Monastir, and Sousse.

By September land operations were again possible and careful plans were prepared by General Saussier. Kairouan and Tunis were occupied, and the tribes of the north subdued by the end of October. Attention was then concentrated on the south, where a chief, Ali ben Khalifa, with Turkish support, had rallied resistance and made many raids on those tribes that had submitted farther to the north. The campaigns of the spring of 1882 and of the winter of 1882-1883 did much to pacify the south, although not until a treaty was signed with Turkey in 1888 did the Ouerghemma and other tribes on the Libyan border finally submit. The arrangements of the Treaty of 1881 were confirmed by the Treaty of la Marsa (8 June 1883) (p. 163).

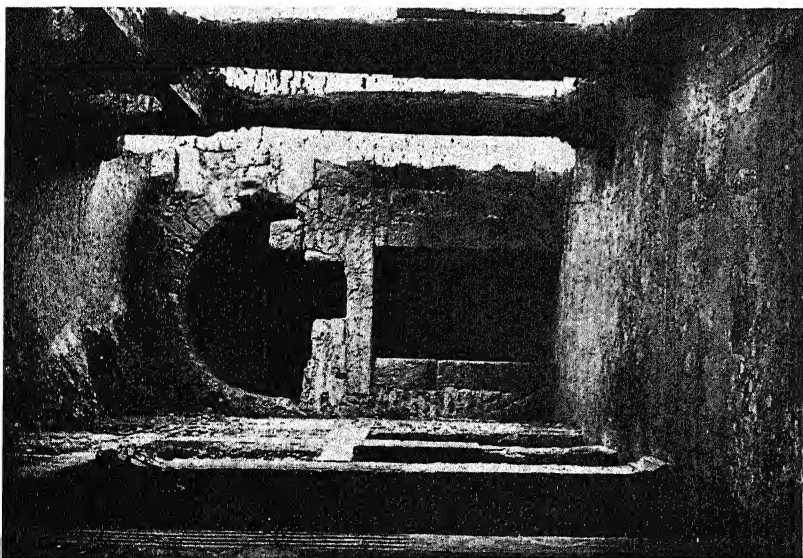
Later in 1883 all the European Powers except Italy abolished their consular tribunals in Tunisia. Italy abolished hers by the Mancini protocol of the following year. In 1896 and 1897 treaties were signed by the Powers in which they gave definite and juridical recognition to the French protectorate by renouncing their capitulatory rights. Italy, however, still retained her rights as they stood before 1881, except for consular jurisdiction. These rights were based on a treaty made in 1868 between the new kingdom of Italy and the Beylicate. In 1895 they were denounced by the French, who in 1896 concluded

three new conventions with Italy, a convention of commerce and navigation, a convention regarding the rights and status of Italian nationals and consuls, and a convention of extradition. These, together with a protocol defining the position of Italian schools and of the Italian hospital in Tunis, still formed the basis of Italian capitulatory rights in 1939. They were to last for nine years, after which they would be automatically renewed from year to year, unless previously denounced: this was done until 1918 (p. 141). In 1910 the Tittoni-Pichon agreement permitted the opening of new Italian private schools and the enlargement of some of the existing Italian schools.

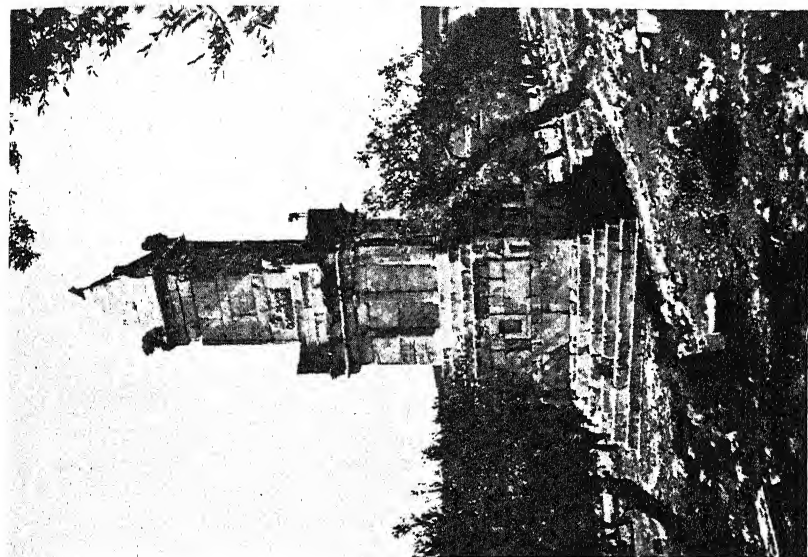
Since 1888 the southern territories, with the exception of Gabès, have remained under military control, and order was maintained until 1915, when some of the Tripolitanian tribes rose against the Italians, who had established themselves in Libya in 1911, and made numerous raids on southern Tunisia. As a result the French had to maintain a force of 15,000 men in the frontier zone until the end of the War of 1914-1918.

The Rise of Nationalism since 1918

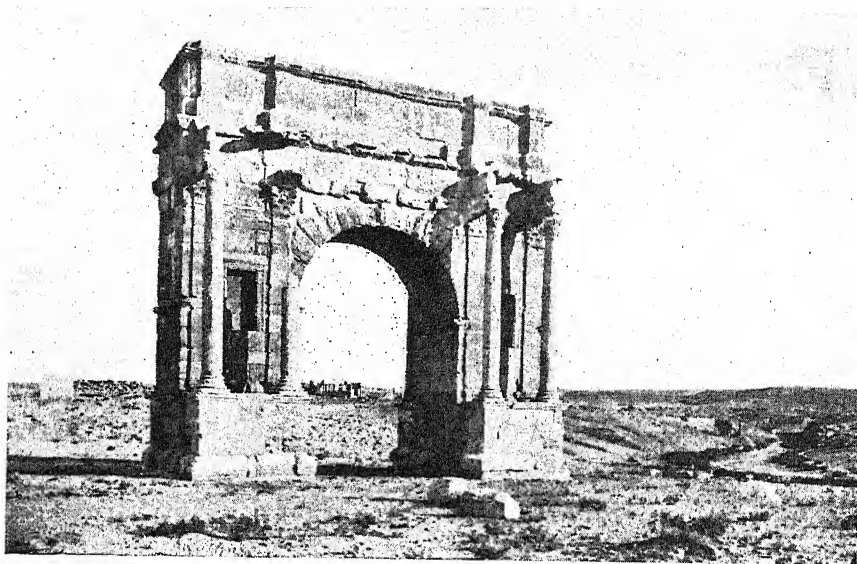
The history of Tunisia since the end of the War of 1914-1918 is concerned mainly with the rise of nationalism amongst the Moslem population and with the aspirations of the Italian settlers for an Italian instead of a French protectorate. Tunisia, which had always been the point of contact between Barbary and the Levant, not only had a cultural life of its own, but also felt the influence of movements originating in the more advanced countries of the Islamic world. After the war the example of the Nationalist movement in Egypt inspired the young Moslems of the Destour party to similar efforts. This Pan-Arab party was founded in March 1920 by Abd al Aziz al Thalalibi, who had been exiled from Tunisia in 1912. It was conservative as regards religion, and socially aristocratic. It rejected the Protectorate but did not want complete independence from France: it had, however, a definite programme of reforms, first formulated in 1920 and constantly repeated, with a few modifications, during the succeeding years. The chief demands may be summed up as follows: a deliberative assembly composed of Tunisian and French deputies possessing equal rights and elected by universal suffrage, with complete financial control; a government responsible to this assembly; the separation of legislative, executive, and judicial powers; the appointment of Tunisian candidates to all official posts for which they showed themselves capable; 'equal pay for equal work' as between



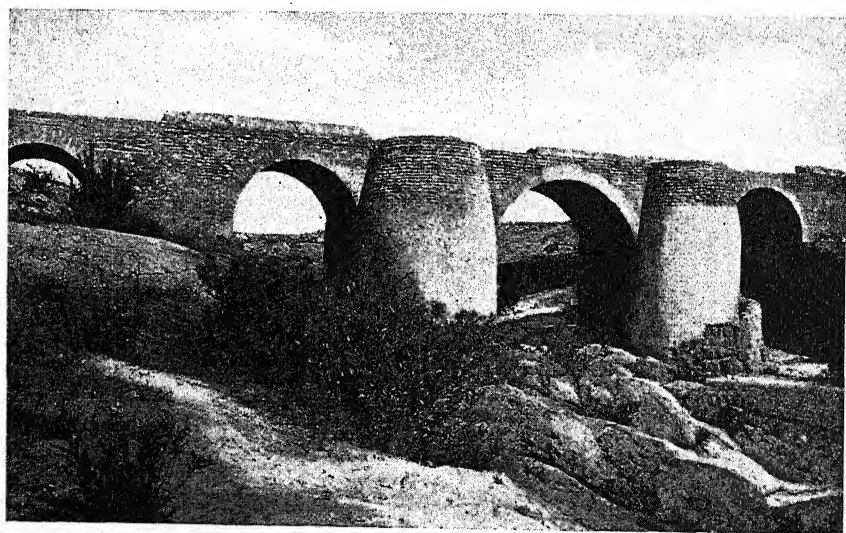
91. Bulla Regia: Roman house



92. Dougga: the Libyco-Carthaginian monument



93. *Sbeitla: the triumphal arch*



94. *Sbeitla: the Roman aqueduct*

French and Tunisian officials in Tunisia; elective municipal councils; freedom of the press, of association, and of institutions; compulsory education; and the participation of Tunisians in the acquisition of lands for colonization and of state lands, in contrast to the existing policy of concentration upon the establishment of French colonists on these lands.

These nine demands were presented by two deputations in Paris during 1920, and by a further deputation in 1921 to the new Resident-General in Tunisia. The only result was the establishment of a Tunisian Ministry of Justice more free from French control than the previous judicial organization. In consequence the Bey threatened to abdicate in 1922, and a military demonstration by the French was necessary to suppress the riots which broke out. Some measure of reform was then granted: a 'Grand Conseil de la Tunisie' was created, together with 'Conseils de Caidat' and 'Conseils de Région', but these were hedged in by so many restrictions that the Moslems were not appeased. In the Grand Conseil, for example, the French and native sections deliberated separately, and were forbidden to discuss resolutions of a constitutional or political nature. In 1924 the original nine points were revived, and a deputation went to France. A Consultative Commission was appointed and sat between 1924 and 1926, but it received little support from the Tunisians because they were given no representation on it, and because it recommended mere improvements, not radical reforms.

In December 1923 a French law had been passed offering French citizenship to native Moslems and Jews possessing certain qualifications. The Destour strongly opposed this law on the grounds that acceptance of a western nationality implied renunciation of certain vital Islamic principles and was tantamount to apostasy; that, though the law was theoretically permissive, the inferiority of Tunisian as compared with French citizens would in practice make the option compulsory; and that the law infringed the sovereignty of the Bey and so violated the Treaty of 1881, on which the French protectorate was founded. So strong was Tunisian public feeling and nationalist sentiment against this legislation that by the end of 1925 only 281 Moslem families had taken French citizenship. In the following years the French authorities made some attempt to conciliate Moslem opinion by carrying out administrative reforms, but after 1932 there were many incidents, some of them very serious. Newly naturalized French citizens were refused burial in Moslem cemeteries; there were riots, and bodies were disinterred. The authorities then provided

separate cemeteries for the native French citizens, but the troubles continued, and in May 1933 the Destour party was dissolved. The Nationalists replied by declaring a strike and a boycott on French goods. In 1934 five dissidents from the Destour executive formed the radical Neo-Destour party, a constitutional body with modernistic tendencies. It called for a legislative assembly with equality between Frenchmen and Tunisians, and adopted a technique based partly on French, and partly on Italian, political methods. Its followers belonged mainly to the artisan classes, and were more anxious to raise their own standard of living than to expel the French, whose Protectorate they tacitly recognized: they were particularly concerned with the hardships resulting from the economic depression, which struck certain sections of the population of Tunisia very harshly. From the first, the new party's relations with the Residency were stormy, and various repressive measures were taken against it and numerous arrests made.

In 1936 the victory of the Popular Front in France stimulated the Tunisians to make further efforts for their rights, and against the citizenship laws. There were labour strikes in July and August, and in December the committee of the 'Ligue des Musulmans Français', consisting of Moslems who had accepted French citizenship, pledged itself to regain Tunisian nationality for its members, and presented petitions to the Bey and the President of France. The following year was marked by more labour troubles, and further petitions were presented to the French Under-Secretary for Foreign Affairs. In 1938 there was a renewal of political incidents, leading in April to the proclamation of martial law, the dissolution of the Neo-Destour party (and also of the Destour, which had been revived in 1936), and the arrest of many of its leaders. From then until September 1939 conditions were comparatively peaceful. One of the main causes of the improvement in the political situation was the outburst of Fascist imperialism in Italy. Though Mussolini proclaimed himself the 'Sword of Islam', Moslems in French North Africa never forgot the methods adopted by the Italians in the pacification of Cyrenaica, and there was a remarkable rally in favour of France as Italo-French relations grew worse, particularly after the visit of M. Daladier to Tunisia in January 1939.

The Problem of the Italians in Tunisia, 1918-1939

The other major problem of Tunisia since the War of 1914-1918 concerns the relationship of the Italian settlers in the country to

the French administration. For France the question formed part of the general problem of Italo-French relationships, which steadily deteriorated after 1918. The delay in settling affairs in Tunisia was due to the fact that the French Foreign Office was preoccupied by greater problems, upon which the solution of the Italian question in Tunisia very largely depended. In September 1918 the French denounced the conventions of 1896, and though in fact they continued to be renewed every three months, the Italian colony lost the guarantee of its political position. The fears of the Italian community were increased by the new policy of assimilation embarked upon by the French in 1920. This policy was inspired partly by the desire for the unification of the European population of Tunisia, and partly by alarm at the declining birth-rate in France, and it aimed ultimately at the assimilation of all the European elements in Tunisia.

The first laws, passed in 1921 and 1923, were directed chiefly against the large Maltese colony in Tunisia, numbering some 23,000, because they dealt only with compulsory naturalization; this could not immediately affect the Italians who were protected by an article in the conventions from any attempt at forcible naturalization. The decree of 8 November 1921 conferred French nationality on persons born in Tunisia of parents one of whom was justiciable as a foreigner by the French tribunals of the Protectorate and was born in Tunisia. In this way the French Government proposed to treat the Maltese as French citizens—for example, by calling them up for service in the French Army—whereas the British Government claimed them as British subjects. The British Government protested against this application of the decree, and after the submission of the case to the Permanent Court of International Justice, the two parties came to a direct agreement, embodied in an exchange of notes dated 24 May 1923, under which Tunisian-born children of British subjects themselves born in Tunisia were to be entitled to decline French nationality on the understanding that this right would not extend to succeeding generations.

The Italians were, however, alarmed by this new policy because they realized that the protection afforded them by the conventions was meagre and might at any moment cease. Alarm increased during 1923 and 1924 when the French passed further laws facilitating voluntary naturalization, by reducing expenses and formalities to a minimum, and by easing the burden of conscription for the new citizens. The Italians could not object to the principle of voluntary naturalization, but they accused the French authorities of abusing

their position by putting economic pressure upon them to apply for it. Many Italians did in fact apply for naturalization after 1924, particularly employees in the tramway and railway services, where the French were better paid than other Europeans. The French do not appear, however, to have exploited the situation in the economic crisis of the thirties, which was very much in their favour, and the policy of the successive Residents-General was to leave the Italian community as far as possible to its own devices. Altogether between 1924 and 1936, 16,824 Italians were naturalized out of a total of about 24,000 voluntary naturalizations.

All attempts at a Franco-Italian agreement over the Tunisian question failed until Mussolini, anxious for French acquiescence in his conquest of Abyssinia, made an agreement with Laval in 1935. The protocol provided for the gradual renunciation by Italy of her capitulatory rights in Tunisia. New conventions were to be drawn up, though the old were to remain in force for another ten years. A sliding scale was established whereby first voluntary, and then automatic, naturalization was gradually applied over a long period. Children born of Italian parents before 25 March 1945 were to retain their nationality: those born between 1945 and 1965 might opt for French citizenship; and those born after 1965 were to be French automatically. Italian schools were to be autonomous until 1955, after which they would be treated as private schools and subjected to French scholastic regulations. Nominally this agreement meant remarkable sacrifices by Italy on the main principle, though in fact a settlement was put off to a period when Mussolini expected the European political situation to be greatly altered. The practical benefits which France was to gain were delayed beyond the ten years' interval prescribed for the new convention, because the French naturalization laws could not permit the protocol to be put literally into effect at once in all its details: automatic naturalization would not begin for thirty years, and would be complete only in 1985, according to French critics.

Both governments signed and ratified the agreement, which, however, never came into force. In November 1938 Ciano revived the grievances of the Italians in Tunisia by his reference in the Italian Chamber to the 'natural aspirations of the Italian people', whereupon the deputies rose in a body shouting 'Tunisia, Corsica, Nice', and in December the Mussolini-Laval agreement was denounced by Italy. After this denunciation the Italians showed uneasiness as to the validity of the conventions of 1896, while the French took their stand

officially by the 1935 agreement as the utmost that they would be prepared to concede. In consequence the legal position of the Italians in Tunisia remained obscure up to the outbreak of war between France and Italy in June 1940. Other references to the problem of the Italians in Tunisia will be found on pp. 149-150, 201-202.

Events in Tunisia since 1939

When war broke out between France and Germany in 1939 the Moslem population proved loyal, many of them volunteering for military service. Italy declared war on France in June 1940, and 23,000 of the Italians in Tunisia were interned. After the Franco-Italian armistice they were released in batches, but many were unable to obtain work, and dislike of them by French and Moslems alike increased. Tunisia was not annexed by the Italians, but under the terms of the armistice the naval base of Bizerta and the heavily fortified Tunisian-Libyan frontier were demilitarized. A disarmament commission was sent to supervise the carrying out of these provisions. All French troops were withdrawn from zones ranging from 30 to 125 miles in width from the Libyan boundary.

The Resident-General at the time of the French collapse, M. Peyrouton, was later appointed Minister of the Interior in the Vichy Government. His place was taken in July 1940 by Admiral Estéva. In September 1940 General Weygand became Delegate-General and Commander-in-Chief of the whole of Vichy Africa: his position in effect was that of a Viceroy responsible only to Marshal Pétain. On 20 November 1941 Weygand retired or was dismissed, and the post of Delegate-General was abolished. General Juin, a released prisoner-of-war, became Commander-in-Chief in French North Africa and Vice-Admiral Fenard was appointed head of a permanent General Secretariat for French Africa, which was directly responsible to Admiral Darlan. Admiral Estéva remained Resident-General in Tunisia. Meanwhile, Germans were replacing Italians in the Armistice Commissions in all three territories of north Africa, several German missions visited Tunisia, and Bizerta, Tunis, and other ports were apparently being used by the Italians and Germans for the supplying of their armies in Libya. Anti-British feeling was officially encouraged, and incidents such as the bombing on 21 October 1941 of the French steamship *Divona* by six British aircraft in Tunisian waters (resulting in the death of eight sailors, including three Moslem stokers) were cited as examples of British treachery.

In November 1942 Anglo-American forces landed in French North Africa. They occupied the French Zone of Morocco and Algeria with little resistance, but met considerable opposition in Tunisia from German and Italian forces which had been rushed to the country from Europe. A bitter campaign was fought in Tunisia in the winter of 1942-1943. The British Eighth Army entered Tunisia from Libya towards the end of March 1943, and after passing the Mareth line advanced rapidly up the east coast. Contact was made with the Allied troops already in the country. Sfax was occupied on 10 April, Sousse on 12 April, and Enfidaville on 20 April. Tunis and Bizerta both fell to a combined assault on 7 May, after which enemy resistance continued for a short period around Zaghuan and in the Cap Bon peninsula. All resistance had ceased by 13 May. The battle of Tunisia cost the enemy 340,000 men (Appendix D).



95. Mosaic from Tabarka showing farm-buildings, vines, and fruit-trees



96. Mosaic from Althiburus (Medeina) showing different types of ships, including horse-boat



97. *Decorative mosaic from Carthage*



98. *Realistic mosaic from Oudna showing men ploughing, tending sheep, watering horses, hunting boar, and trapping birds*

CHAPTER VIII

THE PEOPLE

NATIVE AND EUROPEAN POPULATION

IN 1936 Tunisia had a total population of 2,608,313, a small figure compared with those for northern Algeria (6,500,000) and the French Zone of Morocco (6,300,000). The average density of population in Tunisia (54 per square mile), however, considerably exceeds that of French Morocco (39 per square mile), though it is well below the average for northern Algeria (80 per square mile). Of the total population, 2,395,108 or 92 per cent. were natives, most of them (2,335,623) being Moslems. Of the European population, totalling 213,205, 108,068 were either French-born or had acquired French citizenship, 94,289 were Italians, and 7,279 were Maltese. The elements of the population are described briefly in the following paragraphs: the number and distribution of the various sections of the population are discussed in greater detail in Chapter X.

Natives (Fig. 29; Photos. 108-111)

The natives of Tunisia are Berbers who have already absorbed, or are in process of assimilating, the many immigrants who have entered their country at different periods, as described in the previous chapter. To-day it is often difficult to distinguish Berberized Arabs from Arabized Berbers. All are Moslems, and many centuries of living together have tended to obliterate original differences. Anthropologists, however, recognize areas in which either Berber or Arab characteristics are dominant, as shown in Fig. 29. Berber strongholds still survive in the hilly country north of Medjez el Bab, in the High Tell, around el Djem, and in southern Tunisia in the Nefzaoua and the Monts des Ksour. The areas most arabized include the Sahel and the Low Steppes, apart from the el Djem district, and the Medjerda valley. In the remainder of the country Berber and Arab are inextricably mixed, and in the south there has also been admixture with negroid and Hamitic stocks, giving rise to a *haratin* population in some of the oases. In the towns there are considerable numbers of Kouloughlis, the descendants of Turks and native women.

Though all Berbers are Hamitic, there are many different types, three of which are generally recognized as entering into the com-

position of the Berbers of Tunisia. They correspond roughly to the

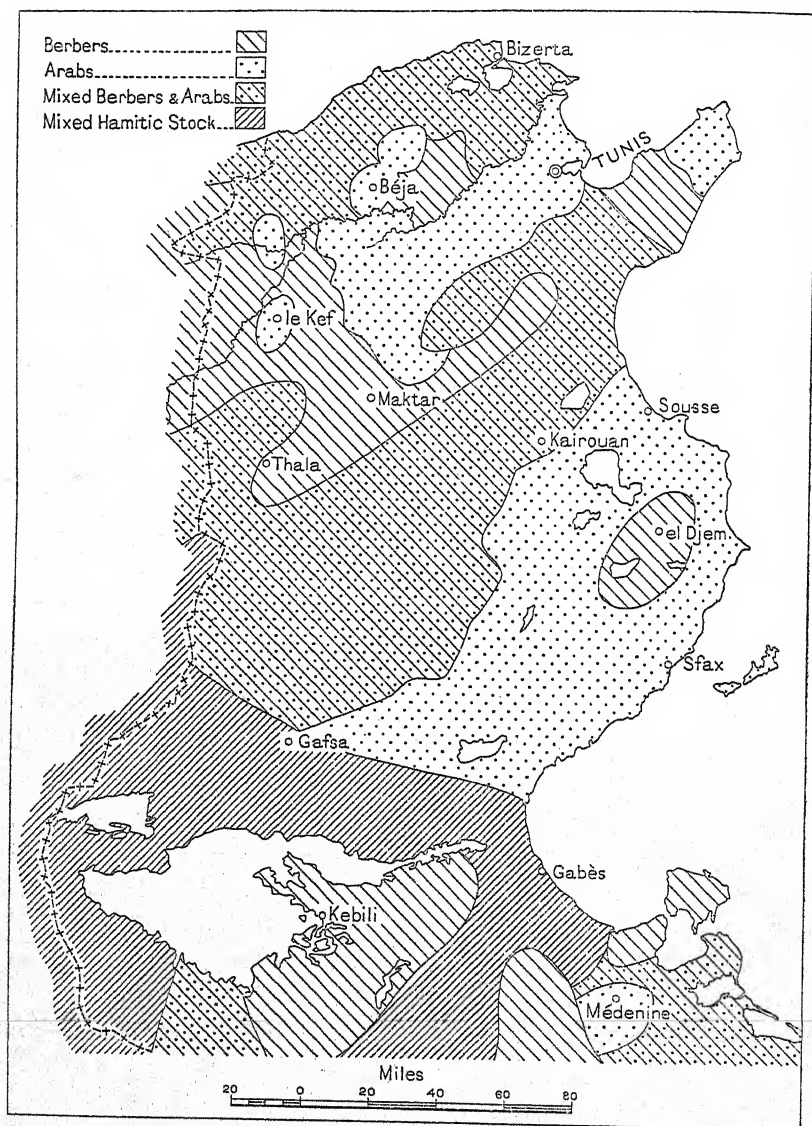


FIG. 29. *The distribution of native races*

'Nordic', the 'Mediterranean', and the 'Alpine' types of the continent of Europe, and are briefly described below.

In central Tunisia a tall dolichocephalic (long-headed) Nordic type is dominant: 5 ft. 7 in. is a common height and the cephalic index averages 74-75.¹ The outline of the skull, seen from above, is generally oval: the face is long and almost oval, the nose is long and narrow, and the chin is square with a rather scant beard. Either these people are derived from the Nordic of northern Europe or they share a common origin. In appearance they closely resemble many of the people of north-western Europe, especially on account of their light-coloured skin.

In the mountains of central Tunisia, and in the far south, a medium or short dolichocephalic (long-headed) Mediterranean type, with an average height of 5 ft. 5 in. and a cephalic index of 72-73, is common. This type usually has a short and broad face, well-developed cheekbones, a fairly broad nose, a prominent and well-bearded chin, and full lips. The back of the head generally projects, often forming a distinct bulge. The skin is swarthy and the eyes dark. These short and dark long-headed people are probably the representatives in north-western Africa of the proto-Egyptian stock of the Nile valley: they show close affinity to the early neolithic inhabitants of France and to the present-day southern Europeans, particularly the Sardinians.

The third type, the Alpine, consisting of short to medium brachycephals (round-heads), appears on the Île de Djerba and on the adjacent parts of the mainland. These people are less than 5 ft. 5 in. in height and have a cephalic index of 70-72; most of them have broad, short faces, round foreheads, and short, rather broad noses. They may be descendants of the short round-heads of southern Arabia or of the Alpine peoples of France. In the extreme south there is a certain mixture of black blood, and there are negroids and pure negroes in many of the oases.

Jews. Included in the native population in 1936 were 59,485 Jews, who, unlike the Jews of Algeria, have never held French citizenship but are subjects of the Bey. Until the middle of the nineteenth century they were isolated from the Moslems, who despised them and forced them to live in separate quarters, known as *harras*, and to wear distinguishing clothing. In 1859, however, the laws against them were abolished, and since then the Jews have used their skill,

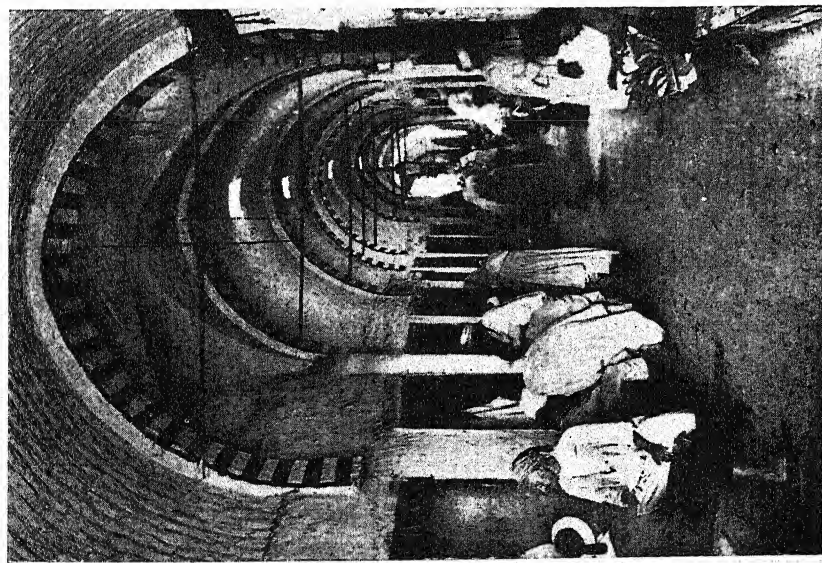
¹ The cephalic index shows the proportion of the breadth to the length of the head as a percentage; two units are added for the difference between observations on the skeleton and on the living. Indices below 75 represent a long narrow head, termed dolichocephalic; those above 80 indicate a round head, or brachycephalic; those between 75 and 80, the most common, are usually called mesocephalic.

powers of adaptation, and practical ability to good effect, and many have risen to positions of importance. Those who came originally from Italy, commonly known as Leghorn Jews, are often rich bankers, traders, money-lenders, and professional men; they usually wear European dress and send their children to French schools. The poorer indigenous Jews dress like the natives and are generally tailors, shoe-makers, embroiderers, butchers, or other small shopkeepers. There are Jewish colonies in all the principal towns, notably in Tunis, but only in Gabès and in the Île de Djerba do the Jews as a whole cling to their old traditions and live apart from the rest of the population.

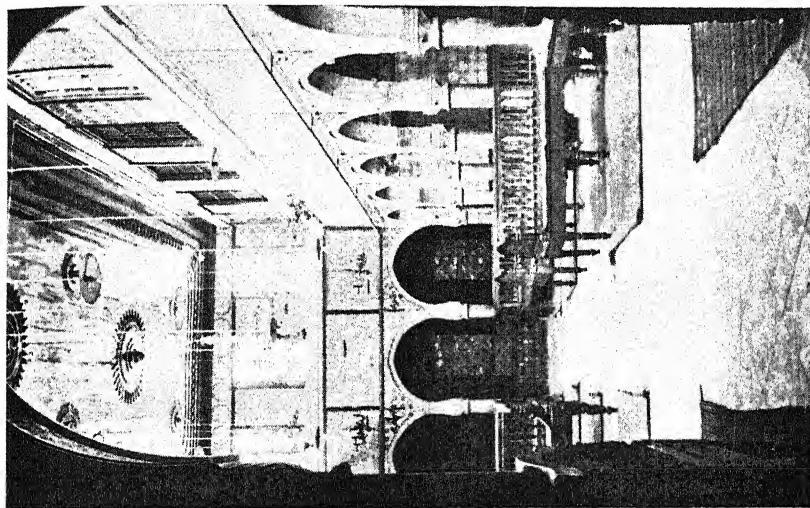
Most of the Jews are strongly pro-French, and many of them are admirers of French culture and education. A considerable number have become naturalized French citizens: some Jews would like citizenship to be granted to the Jewish population *en bloc*. Since 1930 anti-Jewish feeling among the Moslems has been stirred up by the Italians in Tunisia, and between 1931 and 1933 there were riots against the Jews, which led to the suppression of the Destour party responsible for the outbreaks (pp. 138-140). After the armistice in 1940 the Vichy Government adopted an anti-Jewish policy, the basic anti-Jewish statute of metropolitan France being extended, with certain modifications, to Tunisian Jews by Beylical decree on 4 December 1940. Since the liberation of Tunisia all anti-Jewish legislation has been abrogated.

Europeans

The climate of Tunisia makes it a suitable region for European settlement, immigrants from southern France, southern Italy, Sicily, and Malta being especially well adapted to the country. There are difficulties in the way of large-scale settlement because of the already dense native population, but in spite of this there has been a steady growth in the number of Europeans, owing partly to natural increase, partly to immigration, and partly to automatic naturalization. In 1901 there were 129,000 Europeans, in 1926 173,000, in 1931 195,000, and in 1936 213,205 (Fig. 35). About two-thirds live in urban areas, 115,000 of them in Tunis and its neighbourhood. Until recent years there were more Italians than French in the country. In 1881, for example, there were 12,000 Italians and only 700 French. By 1926 there were 89,216 Italians and 71,000 French; the decline in the relative proportion of Italians was due largely to a slackening in Italian immigration from Italy. Since then the French



99. *Kairouan: the Souk des Babouches*



100. *Hara Seghira, Île de Djerba: synagogue*



101. *Gourbi, the northern Tell*



102. *Tent, Djebel Goraa near Béja*

position has further improved until in 1936 there were 108,068 French citizens (including many naturalized Italians) and 94,289 Italians: these figures, though disputed by the Italians, are generally regarded as reasonably accurate (Fig. 38).

French. Of the total French population of 108,000, 78,000 are of French origin (60,000 Tunisian-born, 10,000 Algerian-born, and the rest from metropolitan France). The other 30,000 are French by naturalization or marriage. The true French element forms the aristocracy of the population and consists for the most part of the employers of labour and the owners of capital in agriculture, industry, and commerce. Many are officials and professional men, and all are bound closely in loyalty and sentiment to France.

Italians. Of the 94,000 Italians more than half were born in Tunisia; the rest have come chiefly from southern Italy, including 29,000 from Sicily and 3,000 from the overcrowded island of Pantellaria. They live mainly in Tunis (67,000) and in the surrounding plains, particularly in the Cap Bon peninsula, and as far south as Zaghuan: there are important colonies in the agricultural district round Béja and in the mining area of le Kef. Many of them are farmers, particularly vine-growers, and they are generally very hard workers. On the whole they are unpopular with the Moslems, as they compete with the small native farmer, and lack the prestige of the French.

Before the present war the Italian colony formed a well-organized state within a state, under the control of the Italian Consul-General. It had its own newspapers, schools, hospitals, and charities, and undoubtedly played an important part in the economic life of the country. It has, however, always been a cause of anxiety to the French, because, although the bulk of the people are peasants, small farmers, and labourers, the 2 per cent. belonging to the professional class are very active politically and have always encouraged their fellow-countrymen to resist assimilation by the French. The details of the attempts of the French to assimilate the Italians are given on pp. 140-143. In 1896 an Italo-French convention excluded Italian residents from the French nationality laws and enabled them to retain their Italian nationality from generation to generation: but in 1935 the position was revised by the Mussolini-Laval agreement (p. 142), which established a sliding scale for the gradual application over a very long period first of voluntary and then of automatic naturalization. The agreement never came into force, however, being denounced by Italy in December 1938.

Between 1891 and 1937 about 17,000 Italians voluntarily became French citizens in Tunisia, out of a total of some 30,000 voluntary naturalizations. Most of the naturalizations took place after 1924, that is, after the introduction of new laws governing citizenship by the French authorities (p. 141), and particularly between 1924 and 1933.

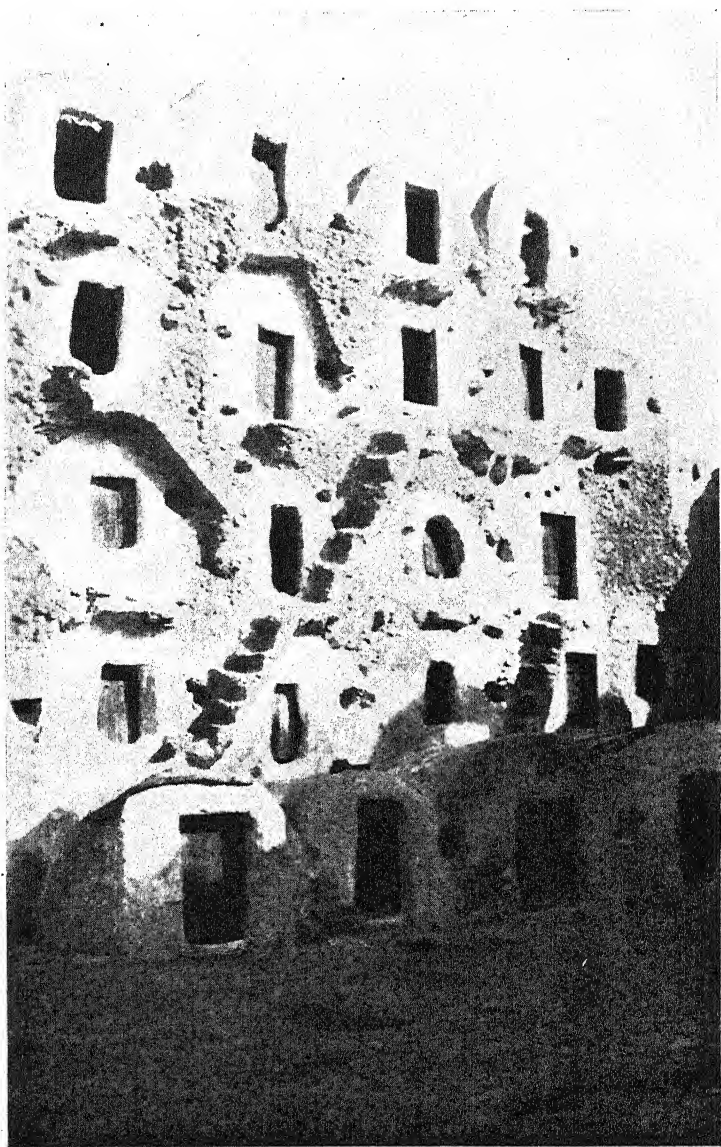
Other Europeans. All Europeans of other nationalities in Tunisia are automatically naturalized in the second generation, but can apply for naturalization before then, if they wish. The largest group is that of the Maltese, who rank as British subjects and are generally proud of their status, although a large number took French citizenship after 1923 (p. 141). In consequence their numbers have declined considerably in recent years to 7,279 in 1936: over 4,800 of these live in Tunis. The Maltese are ardent Roman Catholics. There are about 450 Greeks and between 300 and 400 Spaniards, together with a number of Russians, Czechs, Poles, and others. The number of all these nationalities is decreasing as the naturalization laws are applied. Thus between 1931 and the most recent census of 1936 the number of Maltese declined by 1,364, the Spaniards by 126, the Greeks by 9, and other Europeans (excluding French and Italians) by 341. Further reference to these European elements in the population is made on pp. 198-203.

LANGUAGE

Arabic and French are the chief languages spoken, although the Italian community retains its own language. Only 2 per cent. of the total population now speak Berber dialects: this figure may be compared with 30 per cent. in Algeria and 40 per cent. in Morocco. Tunisia has always been more open than the rest of Barbary to external influences, particularly to those of the Romans and Arabs. It is also farther east, and so has been long exposed to Arab infiltration, and there are few isolated mountain regions, where special dialects could survive, and more open plains. The Berber language is now spoken mainly in the Île de Djerba; it is also used at Sened between Gafsa and Maknassy, and at Tamezred, Douirat, and other villages in the Monts des Ksour. It survives as a written language only in Djerba where a few documents remain. The dialect used is very similar to those spoken by the Tibu (Toubou) and Touareg peoples of the Sahara.



103. *Cave-dwellings, Matmata*



104. *Ghorfas, Médenine*

HABITS AND CUSTOMS

Social Organization

Although the old social organization of the country has been profoundly modified, and even completely broken, for many centuries, the authority of the father over his family and dependants, which has always been the basis of society, remains. The eldest man of the family group has complete control of the younger men, the women, the children, and the servants. The women retain certain rights, such as that of maintaining their personal fortunes, but, on the whole, are despised by the men and treated as mere manual workers. Polygamy is still common, especially among the rich. Originally groups of related families were united into clans or tribes, and these again were linked into larger confederations, but much of this organization has disappeared, particularly in the towns and in settled agricultural districts such as the Sahel and the oases of the south.

With the establishment of the French protectorate, the tribal officials, the *caids* and *cheikhs*, were retained, though their numbers and powers have been much reduced. To-day the tribe tends to be a territorial division rather than a group of families, and the officials are closely supervised and controlled by the French authorities. The *caids*, assisted by *spahis*, are responsible for the good behaviour of their territories, and act as intermediaries between their people and the government of the Bey. They judge trivial cases, can inflict certain punishments, and collect taxes. In the villages they are helped by *khalifas* or by *kahias* (p. 159). *Cheikhs* are proposed by the *caids* but are nominated by the Government: they keep order in the smaller divisions of each territory, and collect the taxes to send to the *caids*. The administrative organization before and since the establishment of the Protectorate is described in greater detail in Chapter IX.

Methods of Life (Fig. 30)

Rural Life. The rural population of Tunisia cannot be divided arbitrarily into sedentary and nomadic groups, as many of the inhabitants are really semi-nomadic. Steppe and cultivated land are often in close proximity to one another, and many families spend part of the year as herdsmen and part as farmers. By occupations the rural population may be divided into fruit farmers, cereal farmers, and herdsmen.

The fruit farmers are the most sedentary of the people of Tunisia. Their trees need constant care and attention, and do not come into bearing for some years after planting. They live mainly in the

coastal districts of the north-east and east, especially near Cap Bon and in the Sousse and Sfax districts. All these areas are densely peopled by farmers who live in villages of permanent houses. In the

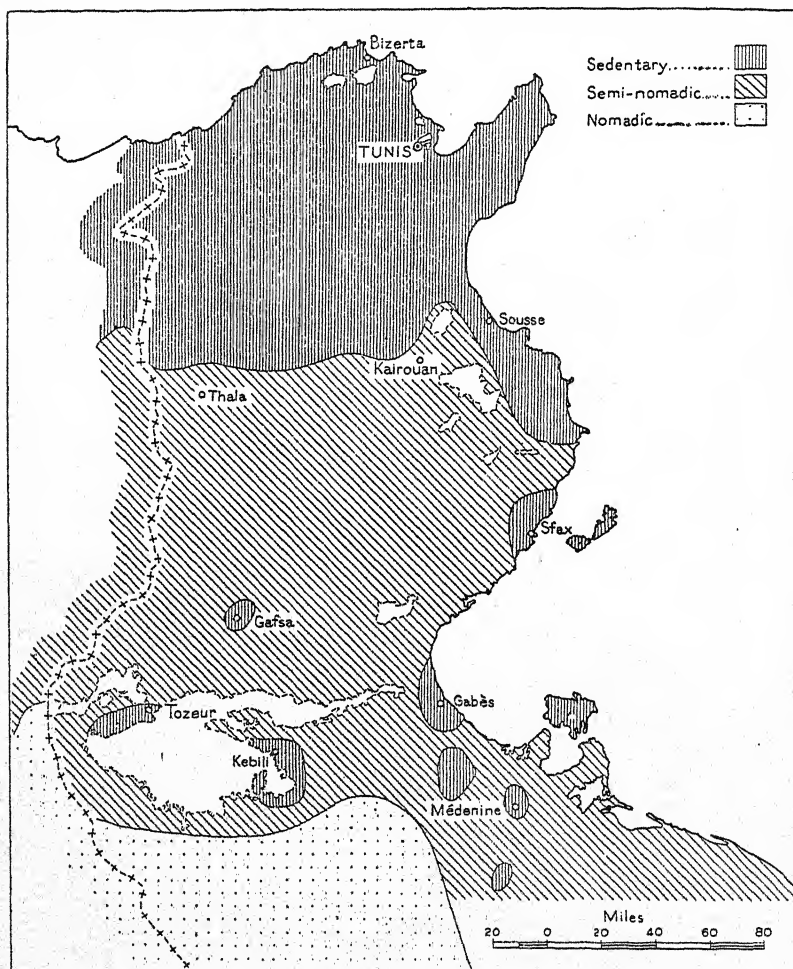


FIG. 30. *The distribution of nomadic and sedentary peoples*

north olives and vines are grown. In the south the date palm is the principal, and often the only, tree grown by the dwellers in the scattered oases.

The cereal farmers, in contrast to the fruit-growers, need to be at their fields only after the fall of rain for sowing, and at harvest.

While at their fields they live in temporary dwellings known as *gourbis* (Photo. 101): for the rest of the year they follow their flocks, or, in the south, live in the villages of the oases.

Nearly all the herdsmen of Tunisia are nomadic, though the distance they travel with their flocks varies considerably. The flocks generally leave the plains for the nearest mountain districts in the hot, dry summer, returning again to the lower land to avoid the cold of winter. The winter house, or *mechta*, is usually in the tribal territory. Long journeys are made only when drought is unusually severe or the cold particularly intense. Many of the herdsmen go to the cultivated land to help with the cereal or vine harvests.

Migration is more common in southern Tunisia than in the north. In Djebel Matmata the herds belonging to mountain villages, such as Tamezred, graze on the surrounding plains. When the rain falls all the men and some of the women leave the village in the care of a few old men and move to the plains to look after their crops. Similarly the oasis dwellers of the south leave their homes at the beginning of the rainy season and do not return until after the harvest. The people of Médenine, for example, go north in October towards the sea and live in tents beside their fields until the crops have been gathered. In June they return to the oasis, where they store the crops in fortified granaries. In addition to this agricultural migration, many of the young men leave their homes to seek work in the coastal towns and do not return until they have earned enough money to buy a house, some palm-trees, or cattle. The people of Djerba resemble the Mozabites of Algeria, living as traders in the towns of the Tell until they can afford to retire to their homes on their native island.

Urban Life. Although only Tunis, Sousse, and Sfax are regarded as *baldia* towns, that is, towns with true bourgeois, the town-dwellers in all the larger centres are very similar. Berbers, Arabs, Spanish, negroes, and Koulougli (descendants of Turks and native women) are mingled together; there are also natives of Tripolitania, the Île de Djerba, and elsewhere living in the towns temporarily to earn a living. The native town is usually distinct from the European quarter, and, as in medieval English towns, the members of one trade live together and have their shops in one particular district. The artisans of each trade are grouped into a corporation under the leadership of an *amin*. Every settlement has a *souk* or market (Photos. 99, 154, 168). There are also a number of agricultural and other settlements with a few Europeans (mainly government officials), such as le Kef, Sbeitla, and Kasserine.

Arts and Crafts. Native arts and crafts are much reduced to-day, partly as a result of the competition of imported goods. Much of what is still made is of poor quality and intended for sale to tourists. The Jews of Tunis, Kairouan, and Moknine make jewellery and copper-ware, but their craftsmanship is poor. Good pottery is still made at Guellala and elsewhere in the Île de Djerba, Médenine (Photos. 191, 192), and Nabeul, where the French have established a factory employing native labour. Carpets and lace are made, mainly by women, carpets in Kairouan, Tunis, and elsewhere, and lace mainly in Tunis. The French authorities have tried to encourage and revive the old crafts, and have established an Institute of Arts and Crafts in Tunis. Further reference to the native industries of Tunisia is made on pp. 339-340.

Dwellings

Over half of the people of Tunisia live away from the towns in huts (*gourbi*) or in tents. The gourbi is the usual form of dwelling in most of the Tell and in the north-east of the steppes (Photo. 101). It is a more temporary dwelling than a house, but cannot be moved like a tent. It varies considerably in construction, but all gourbis are low, with narrow doors which are the only openings. Thatch or branches are used for the roof. The walls are made of various materials: if stone or earth is used the building is known as a *maamra*, if branches as a *kib*, and if palm trunks (as in the south) as a *zeriba*. In the Cap Bon and Sfax districts gourbis are scattered amongst the olive-groves, but in the Sahel of Sousse they are usually grouped in villages.

The nomads of the south live in tents which are made of woollen cloth, or camel- or goatskins. South of a line joining Thala and Maharès, the people are always tent-dwellers: farther north small tents often serve as temporary dwellings for herdsmen and for harvest workers in the Sahel (Photo. 102). The tent cover is spread on a wooden framework, and the interior, which is sometimes 30 or 40 feet wide, is comfortable and healthy, and decorated with rugs and hangings. Each tent is usually divided into two by a cloth partition.

Flat-roofed houses are found usually in the plains, not in the mountainous districts as in Algeria (Photos. 129, 153). They are built round a court where the animals shelter, and the rooms are often lit only by their doors. The walls are usually of stone or a mixture of clay and lime; in some parts very resistant blocks of clay known as *tabia*, or *toub* made of clay mixed with straw, are used. These houses are usually grouped in villages, except on the Île de Djerba where they are scattered throughout the island.



105. *Ghorfas, southern Tunisia*



106. *Zarzis*



107. *Geometrical brickwork, Tozeur*

Houses with tiled roofs are usually in villages of Spanish origin, mainly in isolated groups round Teboursouk, Testour, and Medjez el Bab.

Cave-dwellings are found particularly in the Monts des Ksour, where the people dig holes 20 feet or more deep out of the red marl (Photos. 46, 103). An underground path leads from the side of a hill to the ground level of the excavation, which is usually dug in the highest part of the hill. The open space forms the courtyard of the house, on to which open underground chambers used as stores, stables, and dwelling-places. The side caves are usually about 27 feet long, but only 12 feet wide, and are lit by the entrance alone. In the courtyard is a fire-place for common use, and often a tank into which water is led from the surface by pipes. In the passages there are recesses for stabling horses and donkeys. In Douirat there are caves cut in the sides of the cliffs; in front of the entrance there is frequently an enclosure with a house, through the centre of which a passage leads into the cave behind.

Ghorfas are found in Médenine and Metameur, and in the surrounding country (Photos. 52, 104, 105, 135). The fortified villages (ksour) resemble beehives, of which the ghorfas are the cells. The houses are built on the same plan as that used in the construction of cave-dwellings, but are above ground. They are often seven stories high, and on every story there is a well-barred door to an inner gable, which is reached by steps or stones projecting from the walls. The houses are built round an open square and lie lengthwise, with the gable ends turning towards the streets. They are used mainly as stores, each family having its own section, where grain and other goods can be kept while the men are away.

The dwellings of the natives in the towns are very similar in plan to the flat-roofed houses of the rural peoples. The courtyards are usually smaller and decorated with patterned tiles; the doors are carved and have grills through which the women can look into the street. There are often two stories instead of one.

Dress (Photos. 108-111)

The men always wear a *burnous* or a *haik*: the burnous, the traditional garb of the Berber since classical times, is usually white and consists of a cape fastened at the breast; the haik, which is made of thin material, is brown or white and is worn either alone or under the burnous. Many of the poorer people wear nothing else in daily life, but on special occasions they may appear in a shirt and waistcoat

with a special burnous, or *sjebba*, which is shorter than the ordinary burnous, and is brightly coloured and embroidered, with short, wide sleeves. Many men wear shoes or sandals of morocco leather or hide, and the Arabs always have a white cotton cap covered by a red *chechia* or turban. On the coast the fishermen sometimes wear trousers, and have a short, brown hooded garment instead of a burnous.

The dress of a Tunisian woman consists of a *malhafa*, a long, narrow piece of material wound round the body to cover the back and shoulders; one end is brought over the breast and hangs down in front, the other end covers the lower limbs and forms a skirt. It is held in place by a clasp in the front. In the Monts des Ksour a square of material, known as a *katfia*, is often worn over the bosom, but elsewhere the malhafa is usually arranged to form a full drapery. In the Kroumirie the malhafa consists of two pieces of stuff worn one in front and one behind, held together by the breast clasp, and bound in at the waist by a long woollen belt; a cowl is laid over the neck and shoulders. The malhafa is usually made of dark blue woollen material, but for special occasions it may be red, yellow, or multi-coloured, and of silk or cotton. In most regions a kerchief or *tadchira* is worn on the head round which is wound a turban or *assaba*, made of a piece of material ornamented with coins and trinkets; over this a large embroidered cloth or *begnuk* is often thrown. The feet and legs are bare. Many ornaments are worn, those of the poor being of brass, copper, or horn, and those of the rich of silver and occasionally gold. Strings of beads and large earrings are common, broad open bracelets are often worn on the wrists, and heavy anklets called *kralkral* on the legs. Berber women are usually unveiled, but Arab women in the towns cover their faces.

Those Jews who have not adopted European ways still cling to the costumes designed originally to distinguish them from the Arabs. The men have wide, pleated Turkish trousers, reaching a little below the knee and secured at the waist by a belt; they also wear coat and waistcoat, stockings and shoes, and a tasselled chechia, often surrounded by a turban, on their heads. The women are unveiled, and wear shirts, narrow embroidered silk trousers, cotton stockings, shoes, and pointed caps.

RELIGION

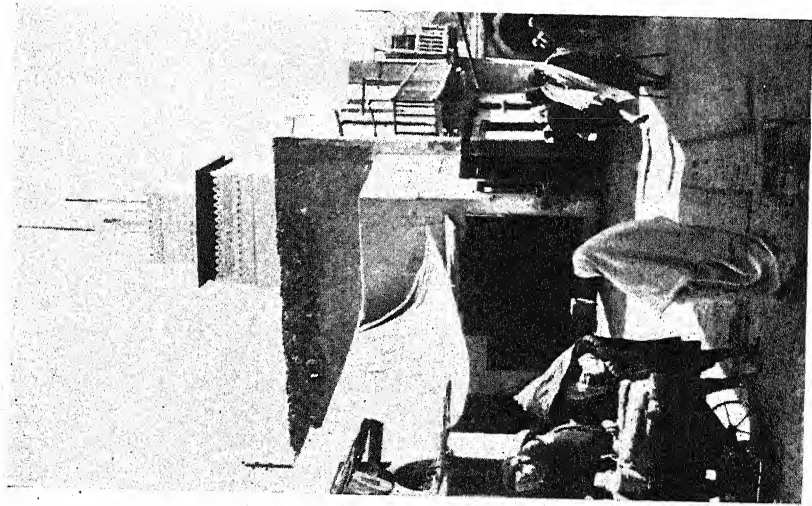
The great majority of the inhabitants of Tunisia are Moslems, whose religion permeates every aspect of their lives. Nearly all of them are Sunnis, so called because they accept the *Sunna* or tradi-



108. *Moslems, Kesra near Maktar*



109. *Jews, Hara Seghira, Île de Djerba*



110. *Native clothing, Sfax*



111. *Moslem women, Bizerta*

tions of Islam, which were incorporated in six great compilations during the ninth century and recognized as orthodox by the consensus of the *ulema*, or learned doctors of the faith. There are also a certain number of Shias, that is, partisans of Ali, the first cousin to the prophet Mohammed and the husband of his daughter Fatima. The Koran is the basis of Moslem law, and to it have been added the sayings of the Prophet, the Sunna. The Koranic writings are learnt by every child, and regulate all relationships and actions. The fundamental belief of the Moslem is in Allah as sole God and creator, and in the prophets, the greatest of whom is Mohammed. Prayers are said five times daily, and the month's fast of Ramadan is observed, but very few Tunisian Moslems make the pilgrimage to Mecca. As elsewhere in north Africa local saints, known as *mrabitin* (sing. *marabout*), who are thought to possess *baraka* or divine blessing, are venerated, and their tombs (*koubba*), usually cubic in form and made of white stone, are centres of pilgrimage (Photo. 114). There is no clergy in the European sense: those who direct the prayers in the mosques are learned men (*imam*) chosen for their piety or knowledge of the rites, which they acquire at the *medersas* or Islamic colleges. They, together with the administrators (*mokkadem*) in the medersas, are usually nominated by the Bey, who is known as 'the chosen of God'. There are numerous brotherhoods, founded by holy men in the past, but they are less important in Tunisia than in other Moslem countries. Each brotherhood has its own headquarters or *zaouia*, often with branches in other parts of the country, and its own initiatory ceremonies, prayers, and religious rites. In the past they had considerable influence with the people, and before the War of 1914-1918 formed the centres of resistance to the French, but since then leadership has passed to the newer nationalist movements, and the power of the brotherhoods to-day is only slight. The chief brotherhoods include the Kadriya, who take their name from Sidi Abd el Kader el Djilani, a well-known saint of the eleventh century; the Rahmaniya, who were founded by the Algerian marabout Sidi Abd er Rahman bou Kobrin and are also active in eastern Algeria; the Tidjaniya, a brotherhood with adherents in Algeria, the Sahara, and the Sudan as well as in Tunisia; and the Aissaoua, followers of the sixteenth-century saint, Sidi Mohammed ben Aissa, whose tomb is at Meknès in Morocco. The Aissaoua are inclined towards fanaticism and practise self-torture. The Chadeliya form only a small and little organized brotherhood in Tunisia. The Senussi (Senoussiya) have never had the political influence in Tunisia that they possessed in Libya and Chad, although

they have been responsible for the stirring up of revolt against the French authorities in southern Tunisia on several occasions.

Many religious customs common in the country before the arrival of Islam survive. These include fetishes such as the hanging of pieces of rag on sacred trees. The evil eye is feared by many, and five is honoured as a lucky number; the mark of five fingers is often put on houses as a means of protection. In some villages the caid is dipped in the well to wet his beard so that rain may fall. Other customs surviving from the distant past are the wearing of the skull cap and turban, the custom of tattooing the body, and the use of henna and *kohl* (*koheul*) (finely powdered sulphide of antimony) by the women for personal adornment.

The Jews have clung to their old religion and customs; a Grand Rabbi, named by decree of the Bey, presides over the rabbinical tribunal, and is responsible for the education of the young. Of Christian communities, the Roman Catholic is the largest, but the Greek Orthodox and the Anglican and other Protestant churches are also represented.

Religious buildings are illustrated in Photos. 1, 100, and 112-122.

ANTIQUITIES

Tunisia is rich in antiquities and ruins belonging to all periods from the time of the Carthaginians, particularly Roman and Byzantine. Before the French occupation, however, little interest was shown in them: many were destroyed by the natives, some being used as quarries of building stone; amateur and professional collectors also did much damage. Since 1881, however, there has been a department for the preservation of ancient monuments, the creation of museums, and the exploration and classification of sites and ruins.

The Musée Alaoui at le Bardo near Tunis has the finest collection of Roman antiquities, particularly mosaics and lamps, in north Africa (Photos. 95-98). Classical Arab architecture is best represented by the beautiful Great Mosque in Kairouan (Photos. 118-120).

Further details are given in Chapters X and XI, and in Appendix C.

CHAPTER IX

ADMINISTRATION

INTRODUCTION

Administration before the French Protectorate

TUNISIA was conquered by the Turks in 1574 and became a Turkish province under the administration of a pasha. After a few years the janissaries revolted and set up their leader as dey. In 1705 the deys were replaced by a dynasty of beys which has lasted until the present time. Tunisia was styled the Regency and remained nominally subject to Turkey, but virtually it was independent. The Bey was known as 'His Highness the Bey, Possessor of the Kingdom of Tunis', and was an absolute monarch. He had a cabinet consisting of the Prime Minister, the Minister of the Pen, and the Ministers of War and of the Marine. Local government was carried on by cheikhs, who administered sections of tribes and were chosen by their own people. Each tribe, or part of a tribe, formed a caidat and was governed by a caid appointed by the Bey. The caids were assisted by lieutenants called khalifas, and by cadets or kahias. The established religion was Islam and the religious head was called the Cheikh el Islam. Moslem law was in force and was expounded by the body of doctors of law, or ulema, at the chief mosque. There are four systems of Moslem law, all based on the Koran: two of these are in force in Tunisia. The Turks adopted the system of Abu Hanifa, known as the Hanifite rite, which is broad and philosophical. The system now chiefly in vogue in Tunisia is the school of Malek ibn Anas, known as the Malekite rite and based upon the tradition of Medina. Both systems are equally orthodox.

There were two types of courts—religious (*chara*) and secular (*ouzara*). The former administered Islamic law (*char*) and decided cases of personal status, succession, private *habus* or *habous* (p. 160), and real property. All other civil cases and all criminal cases were dealt with by the secular courts. The local religious courts were presided over by cadis sitting alone. No appeal lay, but the cadi could review his judgement after a consultation (*medjlès*) with doctors of law or *muftis*. In case of a difference of opinion the case was referred to a medjlès at Tunis and thence, if necessary, to the Bey. Hence 'medjlès' is used as tantamount to appeal court. At Tunis there was a Hanifite medjlès as well as a Malekite, and the defendant had the

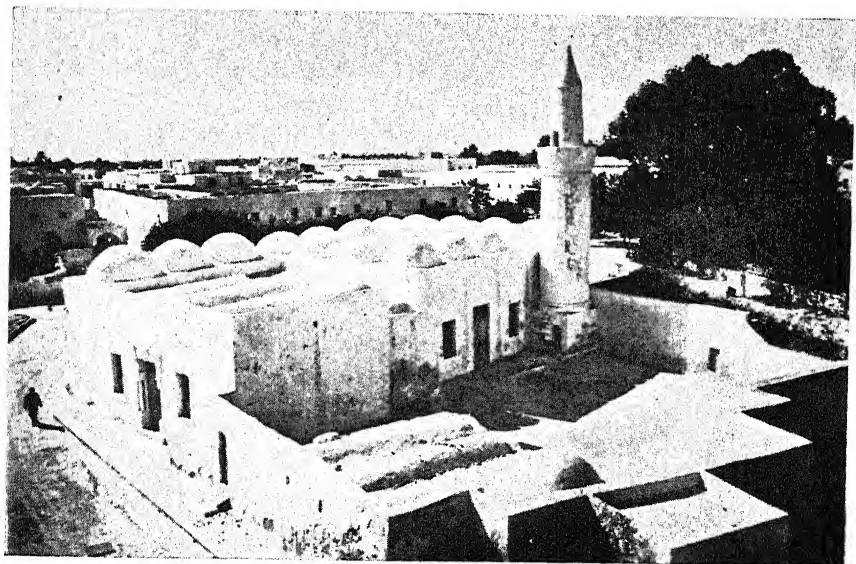
choice. There was also an interlocutory procedure whereby a litigant could procure the written opinion (*mrasla*) of another *cadi* for the guidance of the court. Secular justice was administered by the *cheikhs* and *caids* outside Tunis and by the Bey's court, also known as the *ouzara*, at Tunis. There was no separation of the executive and the judiciary as we know it. Complaints were investigated by secretaries, who rendered reports and submitted draft judgements for counter-signature of the Prime Minister and approval of the Bey. The Jews had their own rabbinical court for dealing with matters between themselves.

According to Moslem law land is either 'live' or 'dead'. Waste lands which belong to no one are considered dead. Cultivation gives a title. *Melk* lands are subject to tithe (*achour*), *arch* lands to tribute (*karadj*). The former resemble freehold and the latter leasehold property. Land can be leased in perpetuity for a rent called *enzel*. There are also *habus*, public and private, similar to *wakf* in the Middle East. A private *habu* is an entail: when the last heir disappears it becomes a public *habu* and is devoted to some Moslem pious foundation, that is, it falls into mortmain. Public *habus* were administered by a body (*djemaa*) to whose representatives (*naïbs*) was entrusted the duty of supervising the officials (*oukils*) in charge of the lands. Private *habus* were managed by trustees (*mokkadem*). Both public and private *habus* were inalienable. There were also tribal lands held collectively and crown lands. The Bey had his own estates and could dispose of waste lands and expropriate *arch* lands. It was customary when land was sold, or the documents of title were lost, to draw up a sort of affidavit (*outika*) and to endorse on it a memorandum of any subsequent sale. An *outika* with three such endorsements was considered equivalent to a title of ownership. If land belonged to two persons in undivided shares, and one sold his share, the other could repay the purchaser and so acquire the whole. This was called the right of *chefaa*.

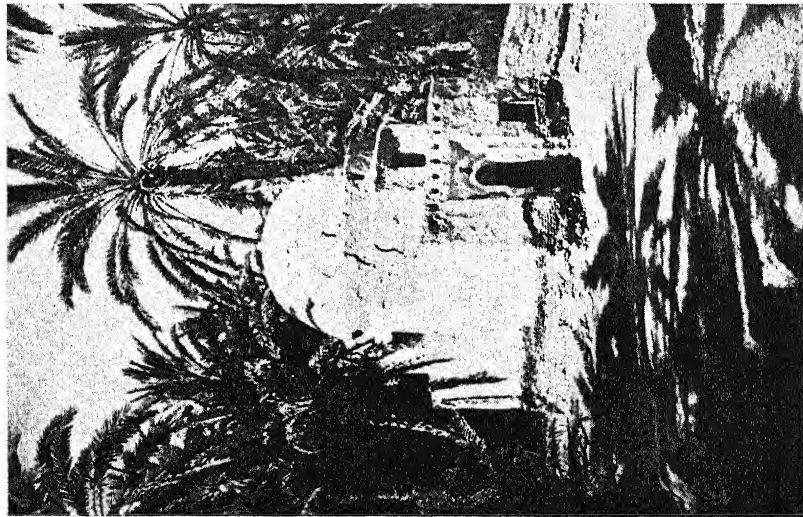
Pre-French Tunisia had its open-air schools, where small boys memorized the Koran, and its university, or Moslem divinity school, established at the Great Mosque in Tunis. Guards kept order; offenders were incarcerated in dark prisons; sanitation was inconspicuous; taxes were collected—capitation (*istitan*), on olive-trees and date palms (*kanoun*), and on cereals (*achour*). In short much the same sort of life existed as goes on in native quarters of north Africa to-day. By the middle of the nineteenth century, however, this patriarchal regime was drawing to a close.



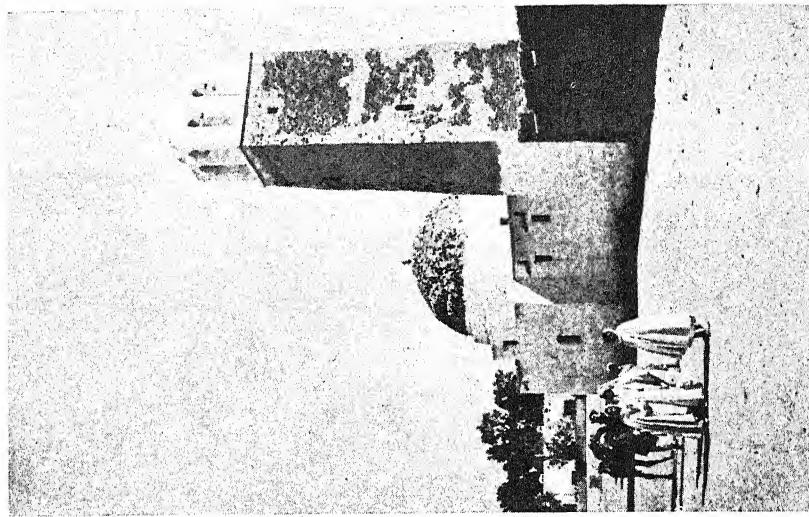
112. *Wahabite mosque, Île de Djerba*



113. *Mosquée des Turcs, Houmt Souk, Île de Djerba*



114. *Nefta: the marabout of Sidi Nessir*



115. *Tozeur: the mosque of Sidi Abid Lakhbhar*

Tunisia had inherited from the Ottoman Empire the system of capitulations whereby foreigners enjoyed extra-territoriality, that is, the jurisdiction of the Bey was ousted by the establishment of consular courts. France concluded conventions with Tunisia in 1824 and 1830. In 1857 the British and French consuls drafted a reformed constitution which the Bey was persuaded to sign, 'so as to be as modern as Turkey'. It was known as the 'Fundamental Pact' and provided for the equality of all before the law and a supreme court of sixty members. The new constitution met with violent opposition and was suspended in 1864. In 1861 France obtained the right to operate telegraph lines and a postal service, and before the French occupation, merchants of Marseilles had set up a chamber of commerce. In 1863 British subjects were allowed to hold real property, subject to local laws and regulations. In 1868 a treaty was concluded with Italy. In 1869 Tunisia became bankrupt and a triple control was established over Tunisian finances, with British, French, and Italian 'controllers'. After the Franco-Prussian War, the Bey turned to Britain, and railways, lighthouses, gasworks, waterworks, and other concessions and industries were placed in British hands. But in 1878 at the Congress of Berlin, Britain agreed to allow France a 'free hand' in Tunisia in return for French acquiescence in the British lease of Cyprus.

The Establishment of the French Protectorate

The French protectorate is founded upon the Treaty of Kassar Said (1881), signed at one of the Bey's palaces and sometimes known as the Treaty of le Bardo. The preamble recites that 'the Government of the French Republic and that of His Highness the Bey of Tunis, wishing to prevent for ever the renewal of the disturbances which have recently occurred on the frontiers of the two States and on the Tunisian coast, and being desirous of drawing closer their ancient relations of friendship and good neighbourhood, have determined to conclude a Convention to this effect, in the interest of the two High Contracting Parties'. The treaty provided for the temporary occupation by French troops of certain points in Tunisia. The French Government guaranteed the execution of treaties existing between Tunisia and the Powers. A French Resident Minister was to be established in Tunis, and no international agreement was to be concluded by the Bey without French authority. This treaty had been drafted by the French Foreign Office some years before, in anticipation of the occupation. The word 'protectorate' occurred for the first time

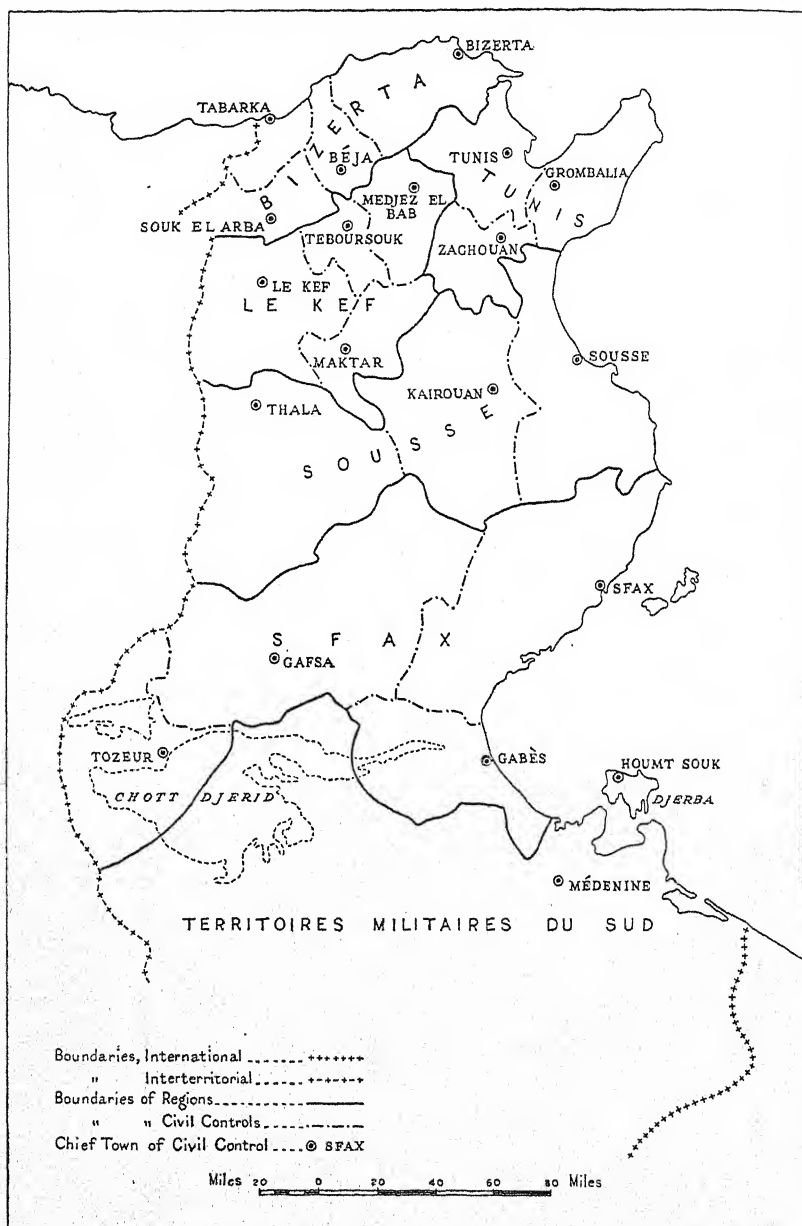


FIG. 31. The distribution of regions and civil controls. The civil controls are known by the name of their chief town in all cases, except that of Djerba

in the Treaty of la Marsa, concluded on 8 June 1883, whereby 'in order to facilitate to the French Government the exercise of its *protectorate* His Highness the Bey of Tunis engages to make such administrative, judicial, and financial reforms as the French Government considers useful'. The subsequent development is founded upon this clause, which gave the French Government a free hand. By 1 November 1884 all the Powers except Italy had given formal recognition to the French protectorate by the renunciation of their capitulations. In a protocol of 25 January 1884 Italy agreed that the Italian consular jurisdiction should be suspended indefinitely, and three conventions on the subject of capitulations were signed by Italy and France in 1896. By the Mussolini-Laval agreement of 1935 Italy agreed to abolish her capitulations by a gradual process extending over twenty years. In 1938, however, she denounced the agreement and the legal positions of Italians in Tunisia became obscure (pp. 142-143).

In the following account the administration is described as it stood before the outbreak of war in 1939: the subsequent history of France has no doubt involved changes, the duration and consequences of which cannot yet be foreseen.

POLITICAL ORGANIZATION

Administrative Divisions (Figs. 31, 32; Appendix G)

Tunisia consists of five *régions* or provinces, under French *chefs de région*, and the military territory (*Territoires militaires du Sud*). The provinces are subdivided into nineteen districts or 'civil controls' (*contrôles civils*) with French Civil Controllers. These are subdivided into *caidats*, and the *caidats* in turn are split up into *cheikhats*. Until 1943 there were five regions, with headquarters at Bizerta, Tunis, le Kef, Sousse, and Sfax. Under the exigencies of war, the French Committee of National Liberation at first reduced the number to three, but afterwards increased it to six, making Gabès a provincial headquarters. It is impossible to say whether this arrangement will be permanent. The original division is, therefore, given in Fig. 31 and in Appendix G. There are also fifty-nine townships or municipalities (*communes*) (pp. 169-170). The subdivisions of the military territory are described as *circonscriptions* or *caidats*.

Native Administration (Fig. 33)

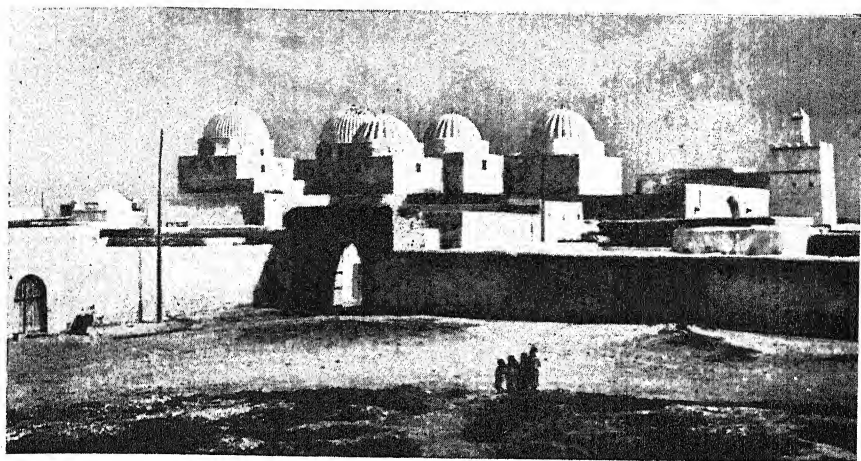
Nominally, the country is governed by the Bey and his ministers, and the French officials merely give advice and provide supplementary

services. Actually the scope of the native administration is limited to a few native institutions, such as the Moslem law and courts, and the French Resident-General and his subordinate staff dictate or themselves carry out the policy of the Government.

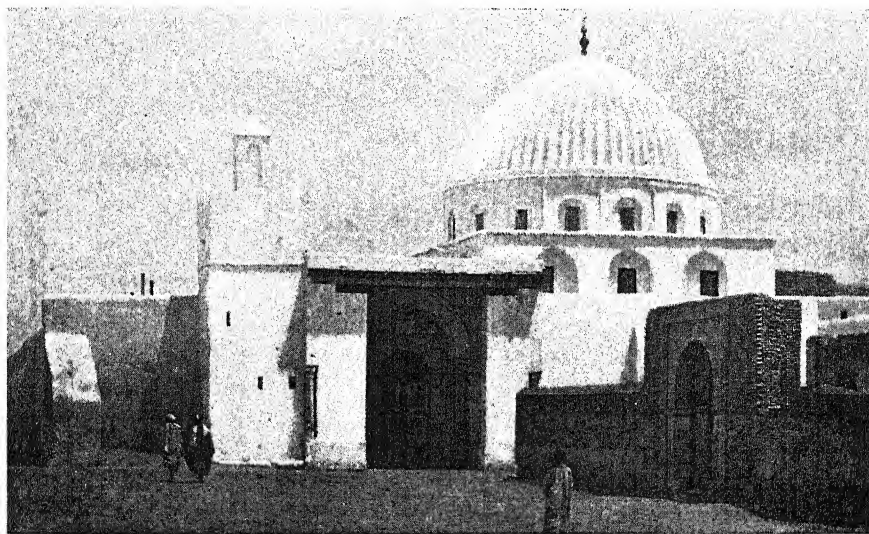
The Bey is accorded royal honours and has a civil list. At functions the Beylical hymn is always played with the 'Marseillaise'. He has his own ministers—the Prime Minister, the Deputy Prime Minister or Minister of the Pen (*Ministre de la Plume*), and the Minister of Justice: the last post was created by the French in 1921. The local native administration is still carried on by caids who are nominally appointed by the Bey, but their number has been reduced and their jurisdiction, which used to be tribal, is becoming definitely territorial over a certain area. Caids are selected from the leading families. They receive a percentage on the taxes which they collect: recently, some have been salaried. The caid is the link between the French Government and the native population. He is responsible for order and has a secretary (paid by Government) and some spahis (native cavalry) at his disposal. He can issue executive orders with the approval of the Prime Minister. He presides over the Caidat Council, composed of representatives of the different cheikhats. This council meets every six months and is concerned with the economic needs of the caidat. It also gives its advice on any local economic question submitted to it by the Prime Minister, with the approval of the Resident-General, and elects representatives on the regional council. Communes are excluded from the field of caidat councils. Caids are assisted by one or more deputies or khalifas who are paid by Government. Caidats are divided into sections under kahias, also drawing government salaries. Cheikhs maintain order and collect taxes, on which they receive a percentage: this is additional to the percentage paid to caids. They are appointed by the Government upon the recommendation of the caids, whom they represent in their cheikhats. The city of Tunis is exceptional. The old native city (the Medina) is administered by the Cheikh el Medina, appointed by Government, with the powers of a caid. The native suburbs of Tunis form a caidat and are administered by cheikhs.

French Administration (Fig. 33)

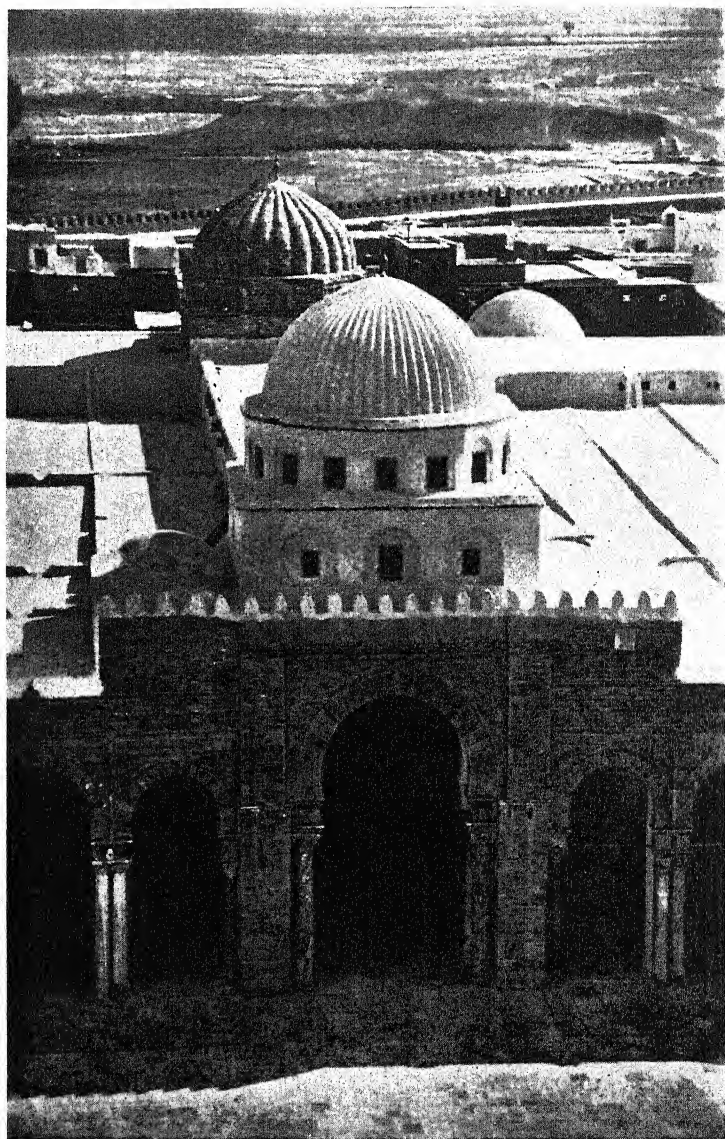
The source of French authority is the Government of the French Republic, consisting of President and Parliament. Whereas Algeria counts as part of France and comes under the Ministry of the Interior, Tunisia and Morocco are protectorates, and as such come under the



116. Kairouan: the Mosque of the Swords



117. Kairouan: the Zaouia of Sidi Abd el Kader



118. Kairouan: the Great Mosque (Djama Sidi Okba), the Inner Court



FIG. 32. *The distribution of caidats. The name of the caidat is given only where it differs from that of its chief town*

French Foreign Office, not under the Colonial Office. The administration of Tunisia is centred in the Tunisian section of the French Foreign Office, which is presided over by the Minister of Foreign Affairs responsible to Parliament. The Resident-General, originally called the Resident Minister, is the head of the French Government in the Protectorate and is responsible to the French Foreign

FRANCE

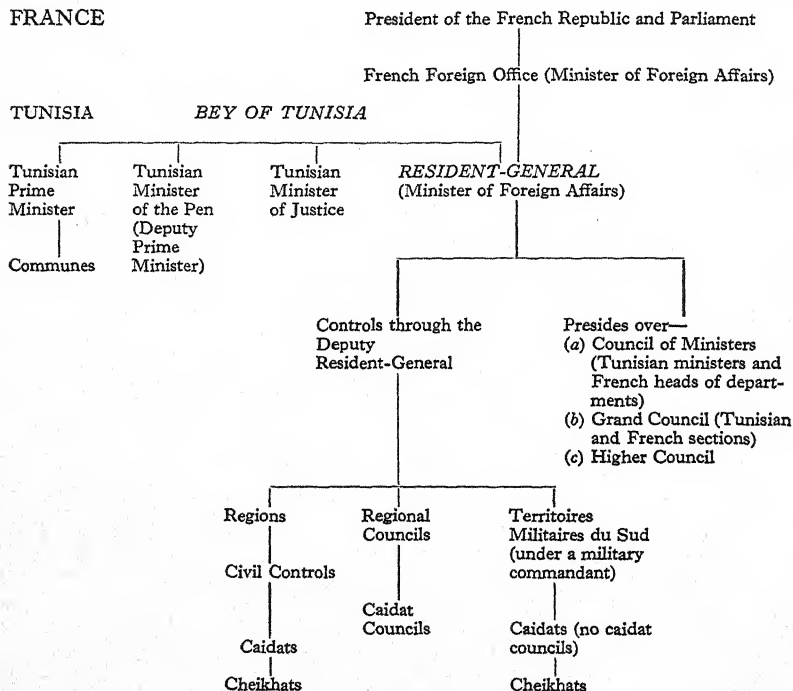


FIG. 33. *Administrative organization*

Office. He has also the title of Minister of Foreign Affairs to the Bey: in fact he controls all foreign affairs. He is assisted by the advice of a Council of Ministers over which he presides. The other members are the Bey's three Ministers, the Minister of War (the French G.O.C.), the Minister of Marine (the Maritime Prefect of Bizerta), the Deputy Resident-General (*Délégué à la Résidence Générale*), Assistant Secretary-General, and the heads of the departments of Interior (or Home), Justice, Treasury, Education, Agriculture and Trade (*Affaires économiques*), Public Works, and Post Office.

In preparing the annual budget of the Protectorate, the Resident-General has the assistance of the Grand Council. With the exception

of two nominated native representatives of the Territoires militaires, the Grand Council is an elective body with separate French and Tunisian sections. The French section (56 members) is presided over by the Resident-General and comprises twenty-two commercial members elected by the Chambers of Commerce and similar bodies and thirty-four members elected by French voters. Each province forms an electoral district. The Tunisian section (41 members) is presided over by the Deputy Resident-General and consists of ten members elected by the Caidat Councils and by the native members of Regional Councils, nine by the Tunisian notables in the capital and the municipal districts, two Jews, two representatives of the Territoires militaires appointed by the Prime Minister, and eighteen members chosen by the Chambers of Commerce and similar bodies. On certain occasions the two sections sit together under the presidency of the Resident-General. A Higher Council (*Conseil supérieur*), composed of the Resident-General, three other French officials, the three native ministers, and a mixed delegation of seven members elected from each section of the Grand Council, meets after the sessions of the Grand Council. Its function is to ratify decisions of the two sections, and in case of disagreement between them it has the casting vote.

The Government of the Protectorate is highly centralized, as it was formerly under native rule. The civil administration is centralized in the Secretariat under the Deputy Resident-General as Secretary-General, with an Assistant Secretary as his deputy. The posts of Secretary-General and Deputy Resident-General were held by the same person until 1943, when the French Committee of National Liberation abolished the latter office as superfluous and increased the powers of the Secretary-General. At the same time the Committee appointed a French *Conseiller de Régence* to establish closer liaison between the French and native administrations, and, therefore, in effect greater French control. The Conseiller has three subordinate *agents de liaison* attached respectively to the Bey's three Ministers. With the aim of centralizing French control the Committee also instituted a *Direction des Affaires politiques* directly attached to the Resident-General, with authority over the services of the Civil Controls, Police, and Native Affairs.

The Secretary-General supervises the activities of the Tunisian Prime Minister. The principal branches of the Secretariat are the secretariat proper, Inspectorate, Law Officers, Native Affairs, Police, and Justice (the organization of the French courts and the Mixed

Court). The Inspectorate is a service not found in the British Colonial Empire. The inspectors visit the Protectorate at frequent intervals and have very full powers of inquiry. They report direct to the Minister of Foreign Affairs in France.

There are seven principal departments of Government—Interior, Justice, Treasury, Education, Agriculture and Trade, Public Works, and Post Office.

The Interior or Home Office (*Direction générale de l'Intérieur*) covers political administration, prisons, and public health. The principal administrative officers are the civil controllers or district governors (*contrôleurs*): in fact, the control is a more important unit than the region, but the controls have been grouped into regions for the purpose of constituting regional councils, composed of French and native members, elected by Frenchmen and natives respectively for six years, and also of French and native elected representatives of the various municipal and economic bodies. The provincial members of the Grand Council are *ex-officio* members of the Regional Council. The Regional Council meets three times a year and is presided over by the senior civil controller as *chef de région*. The chief business of the Council is to pass the provincial budget. Civil controllers are appointed by the President of the Republic and administer the *caidats* within their controls: they correspond to British District Commissioners or District Officers. Besides its administrative functions, the Office of the Interior maintains the male and female prisons at Béja, Bizerta, Gabès, Gafsa, Kairouan, le Kef, Sfax, Sousse, and Tunis. Le Bardo has a male prison and le Djougar a reformatory for youths (*pénitencier agricole*). Detachments of male prisoners work outside the jails. The total number of prisoners on 31 December 1937 was 3,072 (male, 3,007; female, 65), and the average throughout the year was 3,251.

The Ministry of Justice is concerned only with the supervision of Moslem and of Jewish courts, French courts being regulated by the laws of France. The nominal head of the department is the Tunisian Minister of Justice: the real head is the French *délégué au ministère de justice*.

The Director-General of Finance controls the Treasury, taxes, customs, and the Government tobacco monopoly. His department also prepares the annual estimates or budget.

The Department of Education is responsible for primary, secondary, and higher education. Information regarding the country's educational services is given on pp. 180-181.

The Department of Agriculture and Trade (*Affaires économiques*, formerly *Agriculture, Commerce, et Colonisation*) deals with agriculture, European and native, and kindred matters—the veterinary service, lands, forestry, trade and labour, and immigration. State lands in French law are divided into the *domaine public* and the *domaine privé*. The former embraces foreshore, rivers, roads, railways, and all parts of the Protectorate which are incapable of private ownership. The latter includes public acquisitions of land, forests, vacant lands, mines, and generally all land vested in the State which does not belong to the *domaine public*. The *domaine privé* is managed by the Department of Agriculture and Trade and includes extensive plantations of olive-trees. The school of agriculture and the agricultural research station at Tunis, the training-farm of Sidi Naceur at Depienne (Smindja), and various other institutions are controlled by the sub-department of Agriculture. The Veterinary sub-department has an institute in Tunis and a stock-breeding establishment at Sidi Tabet. The Institute of Arts and Crafts is under the sub-department of Trade and Labour.

The Public Works Department (*Travaux publics*) attends to matters such as roads, public buildings, navigation, fisheries, mines, railways, public motor transport, lighthouses, buoys, seaports and airports, waterworks, the *domaine public*, the meteorological service, and surveys. The railways are managed by the *Compagnie fermière des Chemins de fer Tunisiens* and the *Compagnie des Phosphates et du Chemin de fer de Gafsa*.

The Post Office (*Postes, Télégraphes, et Téléphones*) has developed from the French services operated before the establishment of the Protectorate.

Local Government

Regional Councils have been described on p. 168. The lowest local unit is the Caidat Council consisting of natives only, elected for six years by the representatives of the cheikhats; they meet three times a year to discuss local economic questions; the caid presides, and a French official supervises the proceedings.

In France the unit of local government is the *commune*, a term applied equally to towns with half a million inhabitants and to villages with a few hundred. At the head of the *commune* is the mayor, unpaid, elected by the municipal council, the members of which are elected by universal suffrage. He holds court, controls the police, registers births, deaths, and marriages, and generally conducts the town's

business. In Tunisia communes were established for the larger towns and villages. The nominal president of the commune is the *caid*, but the real head is the French vice-president nominated by Government. French and Tunisian members of the Municipal Councils (for urban districts) are nominated by Beylical decree; those of Municipal Commissions (for rural districts) by order (*arrêté*) of the Prime Minister. The deliberations of the council are confined to questions of town finance and town property, and its decisions are subject to confirmation by Government. There were in 1937 fifty-nine communes of varying size. A list of the communes with the dates of their creation is given in Appendix G (Table II). Tunis had, even before the Protectorate, a town council, which was reorganized in 1853.

Chambers of Commerce and Similar Bodies

In Tunisia the flag followed trade, and commercial institutions were established before political ones. In 1885 a Chamber of Commerce was created for the whole country. In 1892 it was divided into two chambers—one for the north and one for the south—and a Chamber of Agriculture was added. These were superseded in 1895 by four chambers, the northern Chambers of Commerce and of Agriculture in Tunis, and the central and southern mixed Chambers of Commerce and Agriculture, at Sousse and Sfax respectively. A fifth—the Chamber of Commerce of Bizerta—was established in 1902. Membership of these five chambers is confined to French persons. More recently a Chamber of Mining Interests was set up in Tunis in 1922: membership is open to both French and Tunisians. Two native chambers were created in 1920, and, after reorganization in 1928, became respectively the Chamber of Native Agriculture of Northern Tunisia (Regions of Bizerta, Tunis, and le Kef) and the Chamber of Native Commerce of Tunis. Each native chamber elects its own officers and has a French technical adviser. The role of these native chambers is to give advice and information to Government and to popularize modern methods. There is also a Jewish Council, founded in Tunis in 1921; its objects are religious and charitable.

Under the Vichy Government all elected assemblies, in the local as well as in the central government, were suspended and replaced by nominated bodies. After the country had been cleared of Axis troops in May 1943, the Grand Council, the Higher Council, and the Municipal Councils and Commissions were restored.

Administration in the Territoires Militaires du Sud

The system of administration so far described does not exist in the Territoires militaires du Sud, which lie on the fringe of the Bey's dominions and are inhabited by nomad tribes amongst whom the Bey's writ did not run. The Territoires are administered by officers of the Department of Native Affairs (*Service des Affaires indigènes*) under the direct authority of the Resident-General, and consisting of three senior officers, twenty-one captains or lieutenants, and eight military interpreters. At the head of the administration is a *commandant militaire*, stationed at Médenine, who is assisted by a clerical staff (*chefs de bureau*) and by *chefs d'annexe*, and has at his disposal a native force of mounted police called *maghzen du Sud*, who supply their own mounts and are paid by the Government of Tunisia. The officers are paid by France but draw entertainment allowance (*indemnités de fonction*) from the Tunisian Government. No caïdat councils have been set up in these territories.

LAW AND ORDER

Legislation

The law of Tunisia is French law grafted on to a native stock. As already stated (p. 159), the French found two schools of Moslem law in force. Real property was governed by Moslem law, and Europeans and Jews as well as Moslems were bound by it in transactions relating to land. This is still the case: the Moslem law of real property has been modified but not abolished (p. 185). The law administered by the native courts is Moslem law, but, in the case of the lay courts, this has been supplemented by the introduction of four codes: the Code of Obligations and Contracts, the Civil Procedure Code, the Penal Code, and the Criminal Procedure Code.

The Protectorate is founded upon the treaties and upon legislation passed in France to give effect to them. The powers of the Resident-General, the establishment of the civil controls, and the application of French law were effected by presidential decrees. To set up French courts the French Parliament passed a law which was promulgated by a formal decree of the Bey. A French law is always necessary to authorize expenditure by France or to empower the Bey to make a loan.

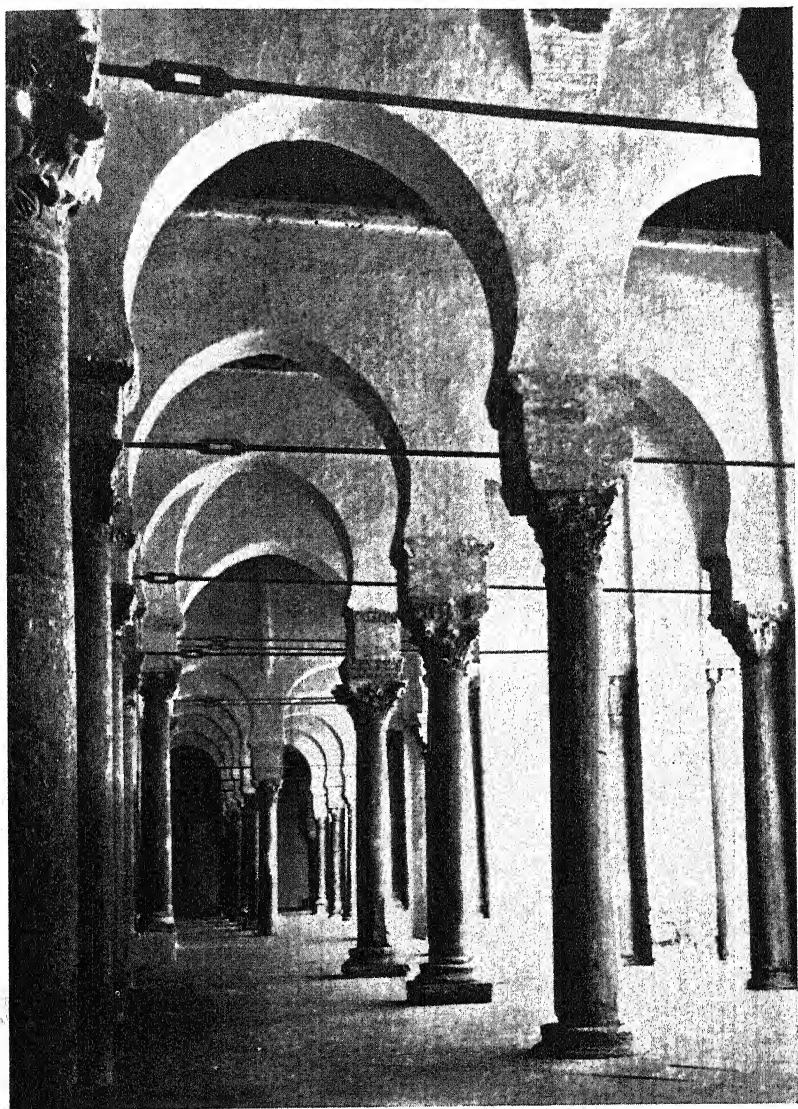
Generally speaking, however, the laws of the Protectorate are passed in Tunis and not in Paris. The laws of France do not apply unless their contents have been re-enacted in the Protectorate, and

amendments made in France must also be re-enacted. There is, however, an exception to this rule. Just as in British Crown Colonies, certain Acts of Parliament are held to be of general application, so a number of French laws which were not enacted for Tunisia have been held to apply to it. Such are the *lois du drapeau* establishing the army and the military courts. Moreover, the majority of the French legal codes has been applied by the French courts in Tunisia. Most of the modern Tunisian law, however, has been introduced by the device of embodying the proposals in a decree and submitting it for the Bey's seal. By the Treaty of la Marsa, as already stated, the Bey pledged himself to carry out any reforms which the French might consider advantageous. When, therefore, an innovation was required, the Resident-General had a decree drafted to embody it and passed it to the Bey for the affixing of his seal. In all except purely French affairs the sole source of legislative authority in the country is nominally the Bey, and it is his decrees which have been responsible for practically all the reforms introduced since 1881. A committee (*Comité consultatif de législation*) was set up in Tunis in 1919 to examine drafts of decrees and other legislation. It still exists, but has been superseded by another committee (*Comité supérieur juridique*). This committee consists of a *conseiller juridique et de législation* (a post created in 1933) as president and four members.

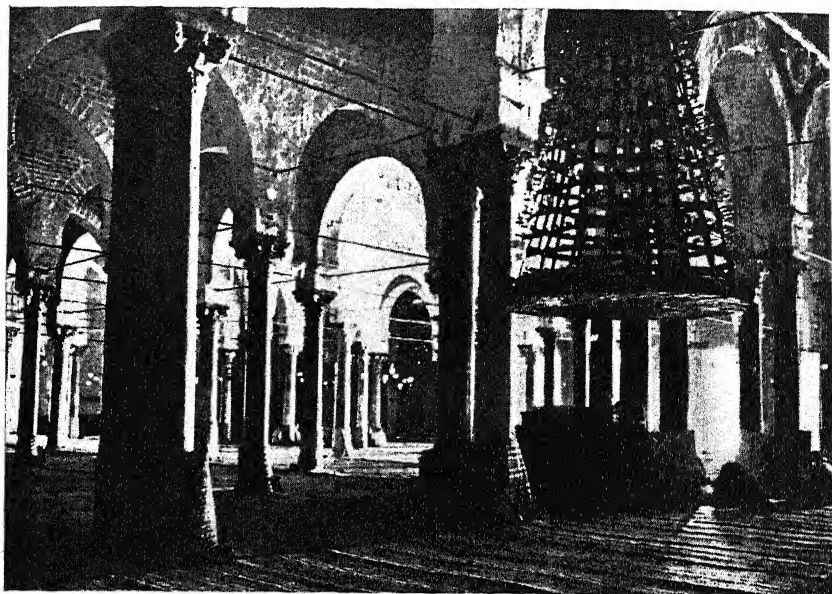
The laws of Tunisia are not confined to decrees of the Bey. Two of the native ministers—the Prime Minister and the Minister of Justice—have delegated powers to issue orders (*arrêtés*) dealing with matters within their scope, with the approval of the French administration. The Resident-General himself can issue orders in matters which concern the French colony exclusively, e.g. the composition of the French section of the Grand Council. The Secretary-General and heads of departments have also limited powers of making regulations.

Courts (Fig. 34)

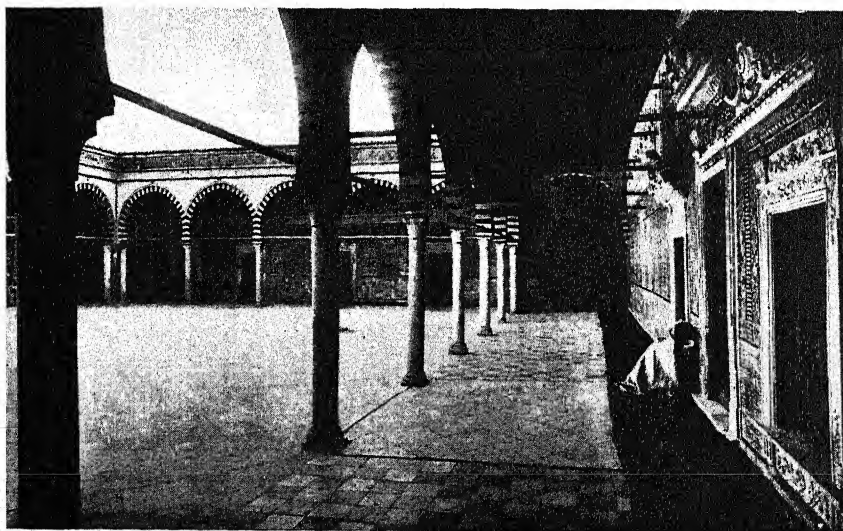
Moslem Religious Courts. As each section of the population has its own law, so each has its own courts. Judgements of native courts against natives are enforced by the native administration, and the French courts do not interfere. When a judgement of a native court affects a French subject or French *protégé*, such as a Maronite or a Christian of the Oriental rite, or any European, it must be reviewed by a French court before it can be enforced. The law of the Protectorate has retained the religious and the secular native courts and



119. Kairouan: the Great Mosque, arcade with Roman columns



120. Kairouan: the Great Mosque, the Hall of Prayer



121. Kairouan: the Zaouia of Sidi Sahab (Mosquée du Barbier)

preserved the distinction between their respective jurisdictions. The religious courts (*chara*) continue to be divided into two classes—courts of first instance presided over by the *cadi* and courts of appeal (*medjlès*). Thirty-six *cadis'* courts were recognized in 1936, and two courts of appeal, as before, one of Malekite law and one of Hanifite law. Each appeal court has four members including two *muftis* and the *cadi*. The Malekite court is presided over by a *bachmufti*, the Hanifite by the *Cheikh el Islam* (p. 159). The procedure by way of *mrasla* (p. 160) had the defect that a *cadi* could receive several contradictory *mraslas*. To stop this it was decreed that in future all *mraslas* must be recorded and must follow precedent.

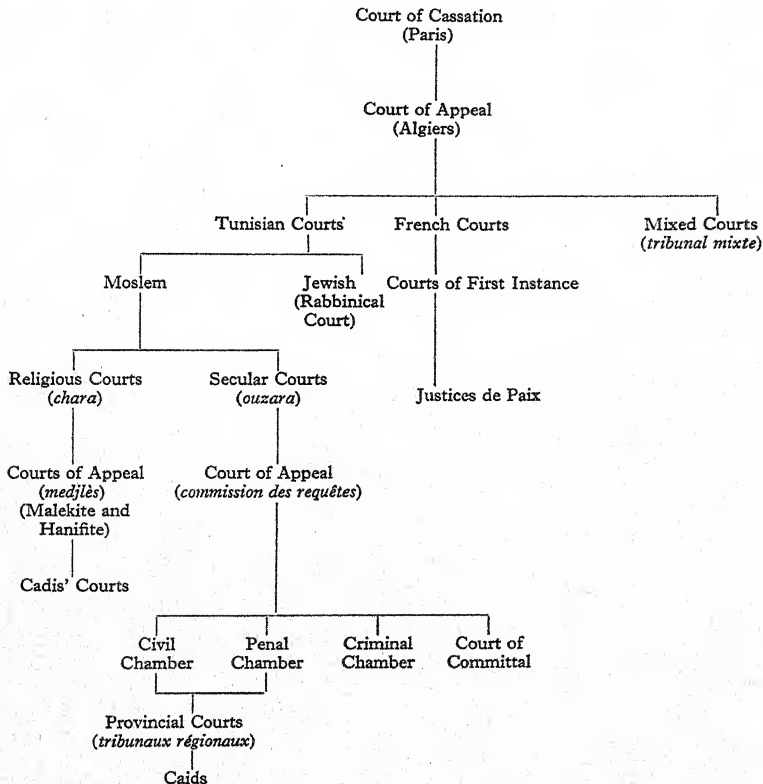


FIG. 34. *Legal organization*

Moslem Secular Courts. The native secular courts have been the subject of considerable reforms which have changed the whole

system. The jurisdiction of the caids in the petty local courts has been regularized, and intermediate between these courts and what used to be the Bey's court (ouzara), a series of provincial courts (*tribunaux régionaux*) has been set up with both civil and criminal jurisdiction. Such courts were established at Sousse, Kairouan, le Kef, Sfax, Gafsa, Gabès, and Béja: Tunis has a similar court called the Driba. During 1937 these eight courts disposed of 16,006 civil cases and 20,745 criminal cases. Appeals were filed in 660 civil cases and 2,116 criminal cases. Part of the jurisdiction of these courts can be exercised by the president sitting as a single judge, and in this way 4,629 civil matters and 22,425 criminal cases were dealt with in 1937. The police have also certain judicial powers and in 1937, 1,884 civil applications and 10,212 criminal cases were dealt with by officers of the *police judiciaire*. Each provincial court consists of a president, two judges, an assistant judge, and a registrar. French officials, with legal qualifications and a knowledge of Arabic, have been attached to the provincial courts and the ouzara to supervise their proceedings, and the procedure has been reformed.

The Supreme Native Court of Appeal. A Ministry of Justice has been created and a native appointed as minister, assisted and supervised by a French *délégué au ministère de justice* (p. 168). These reforms have completely changed the character of the ouzara. It is no longer the Bey's antechamber but the supreme native court of appeal. It now consists of the following sections:

- (1) *Chambre civile*, with a native president and two native judges, sitting as a court of civil appeal from provincial courts. In 1937 it gave judgement in 1,369 appeals.
- (2) *Chambre pénale*, similarly composed, and having an appellate jurisdiction to hear criminal appeals from provincial courts sitting as correctional courts. In 1937 it decided 1,888 criminal appeals.
- (3) *Chambre criminelle*, with an original and final jurisdiction in major crimes. It consists of five native judges and judged 429 cases of major crime in 1937 (including cases investigated in the preceding year).
- (4) *Chambre des mises en accusation* or Court of Committal, the court of the examining judge (cf. p. 177). During 1937 it investigated 264 cases of serious crime.
- (5) *Commission des requêtes*, consisting of a French president and the native presidents of the civil and penal chambers. This chamber is the final court of appeal within Tunisia on points of

law and exercises its jurisdiction in a way similar to the Court of Cassation in France (p. 176). During 1937 it gave judgment in 280 civil appeals and ninety-one criminal appeals (15 of them from the ouzara and 76 from the provincial courts). The *directeur des services judiciaires* attends as *ministère public*, whose functions are explained on p. 176.

The native secular courts deal with all cases to which Moslems alone are parties, except those involving questions of personal status, inheritance, or non-registered real property of Moslems and Jews respectively, which go before the religious courts. There is no right of appeal from Moslem to French law. Petty civil cases, where the amount at stake does not exceed 200 francs, are heard by the *caids*; cases above that amount go before the provincial courts. The *caids* hear petty criminal cases in which the penalty does not exceed fifteen days' imprisonment or a fine of 20 francs or both imprisonment and fine. When the term of imprisonment may be anything between fifteen days and five years, whatever the fine, it is a case for the provincial court. More serious cases are reserved for the *ouzara*.

No appeal lies in civil cases of less value than 200 francs or in criminal cases, except on a point of law, where the penalty does not exceed fifteen days' imprisonment or a fine of 20 francs or both imprisonment and fine.

The French authorities made no change in principle in the legal position of Tunisian Jews. In matters of personal status and succession they continue to be under the jurisdiction of their own rabbinical court and not of the Moslem *chara*, but in all other matters they are subject to the Moslem lay courts, that is, they are subjects of the Bey. They complain strongly of this and contrast their position with that of Algerian Jews, who are French citizens.

The establishment of the Protectorate has introduced French courts which more or less resemble the courts of metropolitan France. French courts have jurisdiction over all cases, civil and criminal, in which one of the parties is subject to French law (i.e. Frenchmen, whether citizens or non-citizens, foreigners, and persons under the special protection of the French Government). Exceptions to this rule are all cases involving personal status or inheritance of Tunisian or Moroccan subjects, and all cases of non-registered real property, which go before the religious courts.

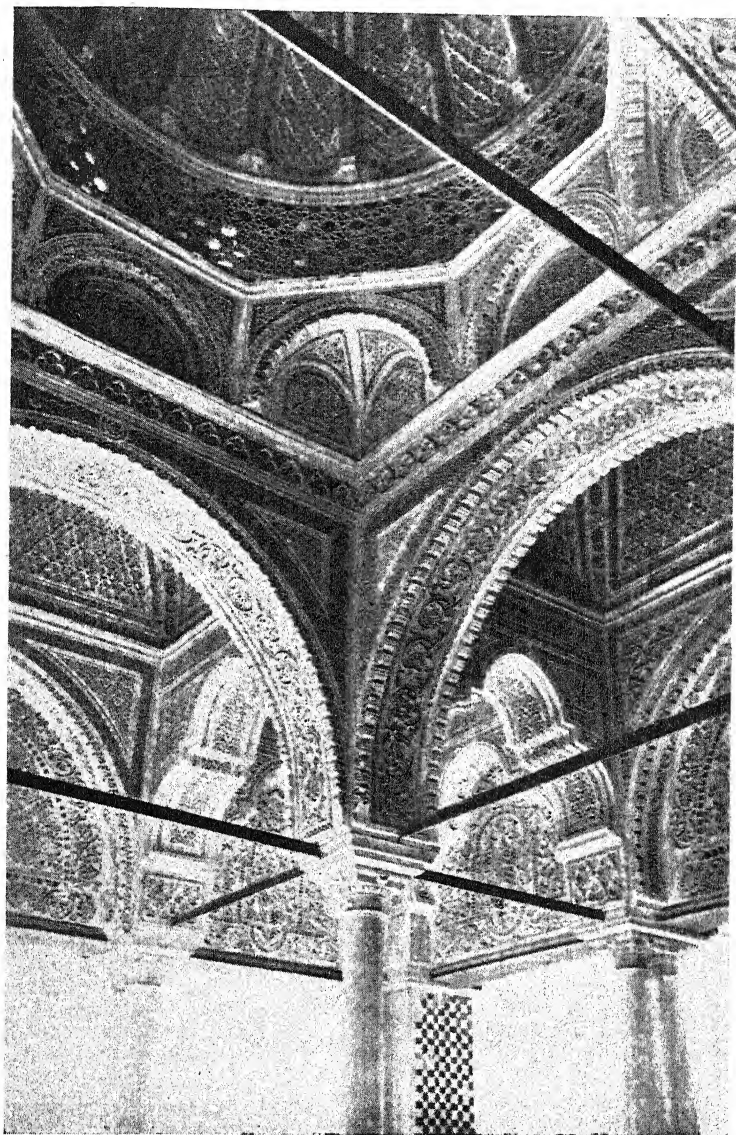
French Civil Courts. In France there is a *justice de paix* in each canton or groups of cantons, a court of first instance in each depart-

ment, courts of appeal for groups of departments, and finally the Court of Cassation. The French *juge de paix* has very little resemblance to the English justice of the peace. He hears petty civil cases, and has the duty of trying to reconcile parties to bigger disputes who can, in theory, proceed with their case in the court of first instance only after he has certified the impossibility of an agreement being reached. In Tunisia *juges de paix* sit regularly in Tunis-Nord, Tunis-Sud, Bizerta, Souk el Arba, Grombalia, Béja, le Kef, Sousse, Sfax, Mahdia, Gabès, Kairouan, Gafsa, and Thala, and hold courts once or twice a month at la Goulette, Tebourba, Zaghôuan, Ain Draham, Tabarka, Nabeul, Medjez el Bab, Teboursouk, Maktar, Zarzis, Tozeur, and Metlaoui.

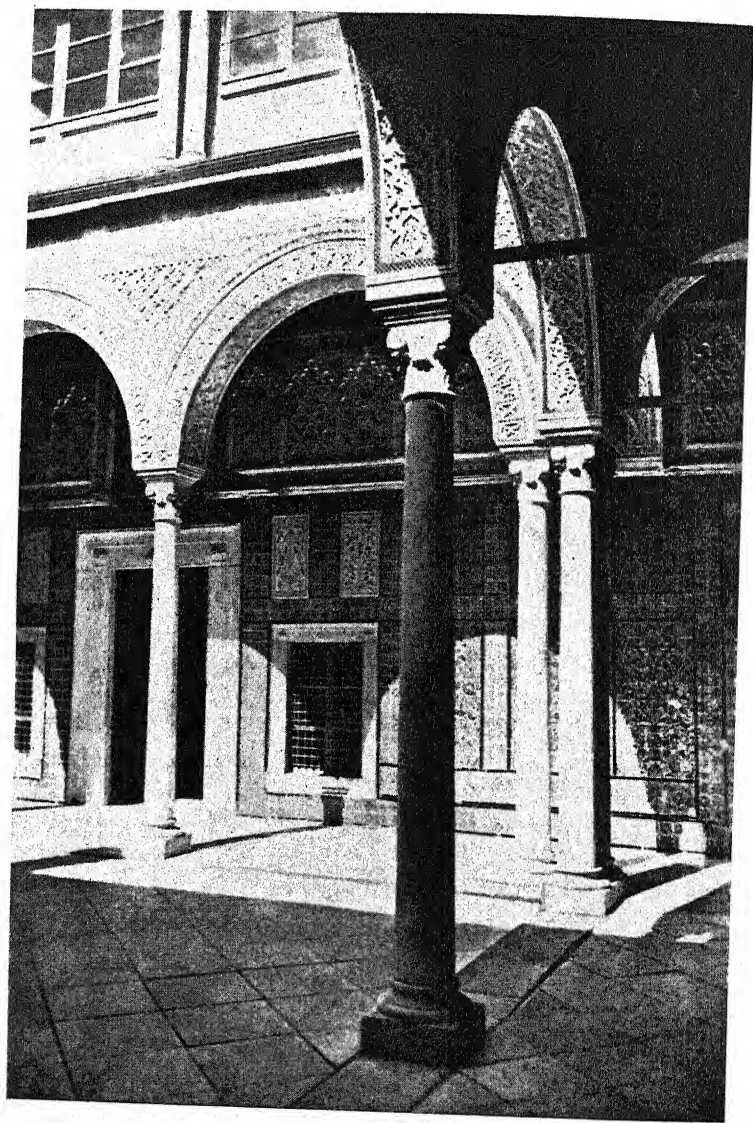
Courts of first instance in France hear appeals from the *juge de paix* and initiate cases above his limits. Their decisions (*jugements*) are given by three judges (*juges*) in the presence of another judicial official who represents the *ministère public*, that is to say the State, and acts in an advisory capacity. The officials of the *ministère public* are the *Procureur de la République* and his substitutes. Collectively they are commonly called the *Parquet*. Tunis has a court of first instance, divided into six chambers with eighteen judges, eight assistant judges, and six officers of the *Parquet*. There is another at Sousse the officers of which consist of six judges, two assistant judges, and three officers of the *Parquet*. In 1937 the court at Tunis heard 8,095 civil cases: the number of criminal cases is not available, but in 1936, 4,266 such cases were heard. The 1937 figures for the court at Sousse were 662 civil and 522 criminal cases.

A Court of Appeal in France hears appeals from courts of first instance and consists of several chambers. The judges are designated as *conseillers* and the decisions of the court, which are pronounced as a rule by at least five judges, are called *arrêts*. In the Court of Appeal, as in the court of first instance, there are officials of the *ministère public*. These are a *procureur-général* who has under him *avocats-généraux* and *substituts du procureur-général*. There is no court of appeal in Tunisia, but an appeal lies to the Court of Appeal at Algiers and from it to the Court of Cassation in France.

The Court of Cassation is the highest jurisdiction in France. It is composed of three chambers, the *Chambre des Requêtes*, the *Chambre civile*, and the *Chambre criminelle*. An appeal lies to the court only on questions of law. In civil cases the procedure is by way of petition (*pourvoi*) for leave to appeal, presented to the *Chambre des Requêtes*. If leave to appeal be granted, the case goes before the *Chambre civile*.



122. *Tunis: koubba in the Parc du Belvédère*



123. *Tunis: Dar Hussein*

If the appeal be allowed, the civil chamber proceeds to quash (*casser*) the decision and to make a remit (*renvoi*) in the case to a fresh trial court. The function of the *Chambre criminelle* is explained below.

French Criminal Courts. In France breaches of the criminal law are classified as petty offences (*contraventions*), offences (*délits*), and serious offences (*crimes*). The *juge de paix* has jurisdiction to deal with petty offences, and his court is then called the *tribunal de simple police*. The prosecution is conducted by the *commissaire de police*, or failing him by the *maire*. In all criminal prosecutions other than those coming before the *juge de paix* a secret preliminary investigation is made by an official called an examining judge (*juge d'instruction*), who may either dismiss the case or order it to be tried. This procedure corresponds in some degree to the manner in which English magistrates dismiss a case or commit the prisoner to quarter sessions or assizes. *Délits* are referred to the courts of first instance, which are then called *tribunaux correctionnels*. The representative of the *ministère public* prosecutes. Serious crimes are referred to the *Cour d'Assises* consisting of three professional judges, the public prosecutor, and a jury of twelve which can return a majority verdict. This court is constituted *ad hoc* at the headquarters of each department. Criminal appeals lie from the *juge de paix* to the court of first instance, from the latter to the Court of Appeal, and from the Court of Appeal and assize court to the Court of Cassation, but no appeal lies from the assize courts to the Court of Appeal. Criminal appeals go before the *Chambre criminelle* of the Court of Cassation, which either rejects the petition for review or else quashes the decision and remits the case to a lower court for re-hearing.

It is usual in colonies to extend the powers of the subordinate European courts, and accordingly the Tunisian *juges de paix* have within their districts the jurisdiction of a *tribunal correctionnel* in cases not involving a penalty exceeding six months' imprisonment or a fine of 500 francs or both imprisonment and fine, subject to a right of appeal to the courts of first instance at Tunis and Sousse, sitting as correctional courts. The latter have jurisdiction in all cases of offences which are beyond the jurisdiction of the *juge de paix*, and from them an appeal lies to the court at Algiers, and from it to the Court of Cassation in France. There is no trial by jury in Tunisia. The most serious cases (*crimes*) are heard by courts (*tribunaux criminels*) sitting at Tunis and Sousse. These courts correspond to the Assize courts and consist each of three judges and six assessors. In 1937,

3,721 criminal cases were heard by the correctional and assize courts at Tunis, and 597 cases by the courts at Sousse.

The criminal procedure is an amalgam of the procedure of the Assize courts and correctional courts in France. No appeal lies from the decision of a tribunal criminel except by way of petition (*pourvoi*) to the Court of Appeal at Algiers, to exercise its jurisdiction in cassation.

Other Courts. France also has industrial, commercial, administrative, and military courts, but it has not been found necessary to establish in Tunisia special courts dealing with commercial or industrial matters involving Frenchmen. Such questions, so far as judicable, are dealt with by the civil courts. There is, however, at Tunis a native court, called the *tribunal de l'orf*, consisting of the Cheikh el Medina and ten assessors, which is a combination of commercial court and industrial court. There are no special administrative courts, and actions to which Government is a party are heard by the common law judges exercising an administrative jurisdiction. Military courts deal with all the breaches of law that a soldier commits during his service, because in France soldiers are cut off from civil life, whereas in England a soldier and a citizen are under the same laws and subject to the same courts.

The *tribunal mixte* is a court peculiar to Tunisia. It deals with applications for the registration (*immatriculation*) of landed property, and consists of both French and Moslem judges, the former being in the majority. Sittings are held at Tunis and at Sousse. No appeal lies from its decisions. French subjects, however, can elect to apply to a French court, whether as petitioners or as respondents.

Armed Forces

Before the outbreak of the present war the army of Algeria and Tunisia consisted of the 19th Army Corps with headquarters at Algiers: it was made up of three divisions, one of which was stationed in Tunisia. Frenchmen resident in Tunisia had to perform their military service in the same way as in metropolitan France. All natives were liable to serve, but the number of men required at any time was obtained by ballot, though substitutes were allowed: they served for three years. The army of occupation consisted of 25,000 men, including 1,145 officers. There were also native regiments of infantry (*tirailleurs*, *zouaves*), Chasseurs d'Afrique, and cavalry (*spahis*), and the Foreign Legion. In the Territoires militaires du Sud the Bataillon d'Afrique was based on Fom Tatahouine, and the Camel

Corps (*méharistes*) replaced the spahis. Officers and a proportion of non-commissioned officers in these regiments were French. The Resident-General was *ex officio* commander-in-chief of all the armed forces in Tunisia and was assisted by a military cabinet. It was in this capacity that he administered the Territoires militaires. The Bey's army (the *Armée Tunisienne*), with a total of 615 officers and men, was trained by a French military mission.

The navy was based on Bizerta, and the command of the Vice-Admiral, who was also naval prefect of Bizerta, extended over Algeria as well as Tunisia. The naval base of Bizerta, commanding the channel between the eastern and western basins of the Mediterranean, was the chief base of the French navy in north Africa.

The three air commands of French North Africa (Morocco, Algeria, and Tunisia) were under a combined higher command with headquarters at Algiers. It was organized into five squadrons. In Tunisia the chief air bases were at Tunis, Bizerta, Kairouan, and Gabès, and there were numerous landing-grounds (cf. p. 414). Naval aircraft were based on the seaplane station at Bizerta.

Police

The organization of the police force is, generally, similar to that in Algeria. There are two divisions, the administrative and the judicial police: the duty of the administrative police is to prevent breaches of the law and disturbances of public order; that of the judicial police is to investigate crimes and collect evidence for the courts.

The administrative police are under the general supervision of the civil controllers in each region, but they work more directly with the caids who are the real intermediaries between the people and the central government. The caids act in conjunction with the police superintendents (*commissaires de police*) and constables (*agents de police*), and, like the mayors of French communes, deal through them with the general preservation of law and order, public security, and general life of the caidat. In addition the caid has a body of native gendarmerie of spahis under his command to deal with special matters (p. 151). Although the maintenance of public security is the main function of the administrative police, the *police mobile* attached to them deal primarily with criminal investigation, which is more particularly the province of the judicial police.

The judicial police act in close connexion with the administrative police. Many are officers of both, and the caids and superintendents of the administrative police can act as officers of the judicial police.

The gendarmerie, which is part of the army, works in conjunction with the general police force. In Tunisia there is one company of gendarmerie which is subdivided into sections and brigades; its headquarters are at the general army headquarters. It maintains security in the caidats, renders assistance in times of danger, and discharges various duties connected with the recruitment and mobilization of the army.

EDUCATION

Moslem education was fairly highly developed in Tunisia before the French protectorate, and the course of instruction at the Great Mosque in Tunis and the zaouias had a widespread reputation. In 1875 the Sadiki college was founded to train public servants and government officials. Since 1881 many new schools have been established and modelled on the lines of those in metropolitan France; as far as possible their curriculum is similar to the French schools, but with certain modifications.

The *écoles primaires*, often called *écoles Franco-Arabes* in the smaller towns and villages, give elementary education. This includes the teaching of the French language, and in certain schools Arabic, reading, writing, and arithmetic. An attempt has also been made to give theoretical and practical instruction in such subjects as agriculture, fishing, commerce, and industry, or industrial apprenticeship, but it met with little success except in the girls' schools. Boarding schools (*internats primaires*) at Armand Colin, Béja, le Kef, Zaghouan, and elsewhere, are provided for the young children of colonists living in outlying districts, and there is an open-air boarding school at Ariana for orphans of the War of 1914-1918. Extended elementary education is given in the *écoles primaires supérieures* in Tunis (3, including 1 for girls), Bizerta, Sousse, Sfax (2), and Maxula-Radès. These schools, besides the normal French instruction, have practical courses in commerce and industry; their passing-out examination is the *brevet élémentaire*. Although most of these elementary schools are administered by the State, a certain number are private schools; some are directed by religious orders, some are Jewish (the curriculum of schools in France is closely followed), and others are maintained by the Italian Government and societies in Tunis and other towns with a large Italian population. Because of conventions with Italy, Italian schools are exempt from inspection, but in 1935 it was arranged that this exemption should cease in 1955 (p. 142). The total number of pupils receiving elementary education in 1937 was 94,449

(63,982 boys and 30,467 girls); of these only 8,924 (4,261 boys and 4,663 girls) were educated in private schools.

Secondary education is given in the eight *collèges* in Tunis (5), Bizerta, Sousse, and Manouba and at the four *lycées* in Tunis. Their syllabus is exactly the same as in similar schools in France, and includes modern languages, history, science, and philosophy: special instruction in French is given for the Moslems and Jews in the schools; the passing-out examination is the *baccalauréat*, which is taken in two parts. The Government makes grants to la Khaldounia, a Moslem college in Tunis which gives a modern education, to about twenty Koranic schools conducted on modern lines, to a private school for girls at Manouba, and to six Jewish schools.

Higher education is given only at the École supérieure de Langue et Littérature arabes, which had 421 students in 1937, and at the Centre d'Études de Droit, where courses are given in law, but the final examinations have to be taken at Algiers. Generally speaking students desiring a university education go to Algiers, the only university in French North Africa. There are also a Centre d'Enseignement d'Art and an École de Musique in Tunis.

Technical and professional education is given at fourteen technical and apprenticeship schools at Tunis, Bizerta (2), Sousse, Sfax, Kairouan, Ferryville, Béja, Gafsa, Chenini de Gabès, Houmt Souk, Djedeida, Beni Kriar (near Nabeul), and Ksar Hellal (near Mahdia). In 1937 there were 1,039 pupils, and among the subjects taught were industry, commerce, dyeing, and weaving. Theoretical and practical instruction in agriculture is given in a number of schools (p. 283). There are two training colleges for elementary school teachers (*écoles normales d'instituteurs*) in Tunis, one for men and one for women. The course lasts for three years, and the passing-out examination, the *brevet supérieur*, is taken after a year's practice in teaching.

PUBLIC HEALTH

Public health assistance was little organized in Tunisia before the French protectorate; the Sadiki hospital was the only hospital in Tunis, and medical attendance was not available to most of the native population. Since 1881 considerable improvements have been made. The Service de l'Assistance et de l'Hygiène publique, a department of the Office of the Interior, was created, and was responsible for the control of medical and hospital services, the inspection of

laboratories and pharmacies, the recruitment of personnel, the supervision of the practice of medicine and ancillary professions, the supervision of the activities of charitable organizations, and the care of the insane and incurables. The country is divided into three medical regions, north (Tunis), centre (Sousse), and south (Sfax), and branches of the service are established in the headquarters of each of these regions.

Increased activity in public health led in 1930 to the creation of an Office of Social Hygiene and Preventive Medicine as an integral part of the service. It had five sections which were concerned with health education and propaganda, child welfare, venereal diseases, tuberculosis, and trachoma. In 1938 a technical council of public health was created under the presidency of the Secretary-General of the Government. Its members included the medical inspectors of social hygiene and of sanitary services, and technical advisers on social hygiene and the anti-venereal disease campaign, public health and infectious diseases, rural medical aid, tuberculosis, trachoma and eye diseases, and child welfare. A representative of the legal department of the Government also served on the council, which had the power to co-opt additional members. The council met at least once a month, and reported to the Supreme Health Council.

Civil and military hospitals have been established in Tunis and other towns with a large European population. In Tunis the Sadiki hospital (256 beds) has been enlarged and modernized and is now solely for Moslems: in 1897 the French civil hospital (585 beds) was founded, and later the Belvédère hospital (400 beds), reserved for military patients including members of the Bey's army. The Jewish hospital (220 beds) and the Italian hospital (150 beds) were established by private donations. There is also a hospital maintained by Alsatian nuns in the suburb of Mutuelleville. In Bizerta there are a civil hospital (60 beds) and a military hospital (250 beds); the Sidi Abdallah naval hospital (400 beds) is at Ferryville. In Sousse there is a regional hospital (120 beds) and a military hospital (100 beds), at Sfax a combined civil and military regional hospital (219 beds) and a small military hospital (60 beds), and at Gabès a military hospital (130 beds). All military hospitals have accommodation for civilian patients. There is a mental hospital at Manouba. In the Territoires militaires there are garrison hospitals for military personnel and infirmaries for civilians at Foum Tatahouine, Ben Gardane, and Médenine, and infirmaries for civilians at Zarzis, Matmata, and Kebili.

Special public health facilities for the rural population have been

organized since 1910. At the chief town of each medical region there is the regional hospital (*hôpital régional*), with laboratories and prophylactic and hygiene centres. The regions are subdivided into districts (*circonscriptions*) at the head of which there is a State doctor (*médecin de l'Assistance médicale gratuite*, or more commonly *médecin de colonisation*). There are infirmary-dispensaries (*infirmières dispensaires*) under the State doctors at the chief town of each district: these have a few beds for in-patients, but most of the treatment given is for out-patients. In 1938 there were infirmary-dispensaries at Béja (27 beds), Enfidaville (11), Ferryville (9), Gabès (20), Gafsa, Grombalia (12), Houmt Souk (22), Kairouan (40), le Kef (84), Mahdia (20), Maktar (12), Mateur (31), Médenine (38), Medjez el Bab (22), Menzel Temime (12), Monastir (40), Nabeul (20), Souk el Arba (70), Souk el Khemis (76), Tabarka (4), Tebourba, Teboursouk (4), Thala (12), Tozeur (20), and Zaghuan (8). There are also several polyvalent dispensaries which concentrate on the prevention and control of tuberculosis, venereal diseases, trachoma, malaria, leprosy, and infant mortality; they serve as the headquarters of the State nurses (*infirmières visiteuses*). These dispensaries have no in-patient accommodation, but work in collaboration with the hospitals and infirmary-dispensaries.

There are doctors (*docteurs en médecine*) in all the larger towns and villages. In 1938 there were 357 registered medical practitioners in Tunisia and 69 dentists. Of these, 219 doctors and 49 dentists were in Tunis, 10 doctors and 7 dentists in Bizerta, 13 doctors and 1 dentist in Sousse, 17 doctors and 6 dentists in Sfax, and nearly 100 doctors elsewhere. Of the 112 pharmacists in the country, 75 were in Tunis. In the larger towns municipal doctors (*docteurs municipaux*) are responsible for the treatment of the poor. The people in remote country districts are attended by over twenty State doctors who attend the sick (natives free of charge), vaccinate, and distribute quinine. They are also responsible for sanitary supervision in their districts, including the medical inspection of schools and other institutions, and are in charge of the local infirmary-dispensary. They notify and fight epidemics, as well as trachoma and other eye diseases. State nurses, many of whom are trained midwives, often accompany the doctors on their rounds. Their work lies chiefly in the homes of the people, but they also tour outlying districts. They are trained at the École professionnelle d'infirmières visiteuses in Tunis. In the Territoires militaires army medical officers are responsible for a large part of the civil medical practice.

In all the ports the Service sanitaire maritime, a branch of the Public Health Service, has agents who attend to sanitary and quarantine measures, and are responsible for the health supervision of the Mecca pilgrimage traffic. They are also in charge of all duties envisaged by the International Sanitary Convention, including the inspection, disinfection, and sanitary supervision of ships, their passengers, and crews, and the destruction of rats on board. Complete port health installations exist at Sfax, la Goulette, and Sidi Abdallah; the last is reserved for the treatment of warships. Ghardimaou has a disinfection and delousing post.

As in nearly all parts of the French Empire there is a Pasteur Institute affiliated to the parent institution in Paris. In the Pasteur Institute in Tunis is centred the general direction of all scientific medical investigation and research carried out in the country; it has made many important contributions to medical knowledge. In addition to research it manufactures vaccines of many kinds. The malaria laboratory of the Health Service, an entomology laboratory, and the laboratory of the French Civil Hospital are attached to the Institute.

Besides official public assistance there has been considerable aid from about fifty benevolent societies, which are often subsidized by the State and co-operate closely with the health service. Their chief concern is the care of children, and the founding of crèches, dispensaries, and services for the domiciliary care of the sick, and of homes for the aged. The Institut héliotherapique at le Kram specializes in treatment for tubercular patients. The Société Française de Bienfaisance receives subventions from the Government. The Société Musulmane de Bienfaisance and the Société Israelite take care of their respective communities, as does the Union of French women. The Société de Secours aux Blessés militaires is an offshoot of the French Red Cross. In Tunis there are also anti-tubercular dispensaries and institutions for deaf-mute and blind children. In 1925 the Écoles d'infirmières were founded for men and women preparing for their State diploma.

LAND TENURE

The systems of land tenure recognized by Moslem law (described on p. 160) proved inadequate after the establishment of the French protectorate and the arrival of European settlers. The system of conveyancing by means of outikas (p. 160) was unsatisfactory to Europeans because an unscrupulous vendor could resell the land on

his own title; nor was the chara (p. 159) a satisfactory court for them in land cases. The French, therefore, in 1885 induced the Bey to pass a decree introducing registration (*immatriculation*) of land founded on the Torrens system. This system was the creation of Sir Robert Torrens who was struck by the simplicity of transfers of ships by mere entries in a register and adapted this to land in South Australia, from which it has spread to other countries, both within and outside the British Empire. The chief features of the system as originally devised are that it confers an indefeasible title and substitutes for a bundle of title-deeds a certificate on which transactions are noted. The Tunisian adaptation, however, is only partial, and registration is not compulsory.

The proprietor, or certain other persons having an interest in the land, including habus, applies to the *conservateur de la propriété foncière*. The application is advertised, the land surveyed, and the application referred to the tribunal mixte. If the tribunal grants the application the conservator issues a certificate, known as the *titre bleu*. All rights of property existing at the date are recorded on the certificate which wipes out all previous claims. All future transactions to be effective must be inscribed on the certificate, and the land is transferred to the jurisdiction of the French courts. The rights of chefaa and enzel (p. 160) are preserved by the new law, but much of the French land law is introduced.

Many of the early applications for immatriculation were refused by the court and this is said to have had a bad effect, but, since the procedure was simplified and linked with a cadastral survey, applications have become more numerous. From 1886 to 1937, 22,896 applications for immatriculation were received, covering 6,071,112 acres of lands with a declared value of 797,852,239 francs; 18,624 certificates of title were granted, covering an area of 3,722,486 acres, valued at 577,498,207 francs. In 1937, 468 applications for immatriculation were decided by the mixed courts, but there were considerable arrears and 1,865 were pending at the end of the year. Of the applications dealt with, 418 were granted, 43 dismissed, and 7 withdrawn.

The way in which the veto upon the alienation of habus was overcome, so as to promote colonization, is interesting. The first device was by use of the contract of enzel (p. 160). The Bey was persuaded to enact that habu lands might be leased in perpetuity when it was to their advantage. A later decree provided that such grants must be put up to auction, and compelled the grantees to apply for immatri-

cultation. The second method was by way of exchange, either for other land or for money. The applicant puts in a written application to the president of the djemaa (p. 160) who can sanction the exchange of private habus. The application then goes before the chara which makes or orders a valuation of the lands and finally the exchange is approved by the Bey. The land given in exchange becomes habu. If money is offered in exchange, the habu land is put up to auction and the price is used to purchase another property which in its turn becomes habu. The third method is by means of leases for ten years, renewable for two further terms of ten years, after which the land is leased on ordinary terms.

The transformation of part of the habu lands has benefited colonists but has touched the native population in its religious feelings and also in its pocket, since the natives used to get leases of habu lands at moderate rents.

The extent of cultivable land is estimated at about 35,000 square miles of which, as has been shown, less than 6,000 square miles have been 'immatriculated'. The law relating to the rest was the subject of a reform in 1935. Public registers are set up in each caïdat in which particulars of rights over these lands are recorded. A page is opened in the register for every property which has been included in a cadastral survey but not immatriculated; otherwise the owner, or certain other interested parties, can apply for a page to be opened. The boundaries are demarcated after public notice and a plan is made showing all claims to rights in the land. After inquiry on the spot, the contents of the plan and register are settled and, after a year's interval, become final. Thereafter, rights in the land have preference according to the dates of their respective entries in the register. The decree also prescribes the information that documents tendered for inscription in the register must contain, the duties of notaries and of the keeper of the register, remedies of injured parties, penalties, and various other matters. The land continues to be under Moslem law, with certain modifications, unless it is afterwards immatriculated, in which case the entry in the register is cancelled, and the land comes within the jurisdiction of the French courts.

CHAPTER X

POPULATION

BEFORE the establishment of the French protectorate in Tunisia in 1881 the population was estimated at about 1,500,000 natives and 14,000 Europeans. By 1911 the population had risen to 1,909,087 including 148,476 Europeans: there was, however, considerable doubt as to the exact number of natives, who were first counted with reasonable accuracy in 1921. Since that year there has been a steady increase in both the native and European population (Fig. 35). At

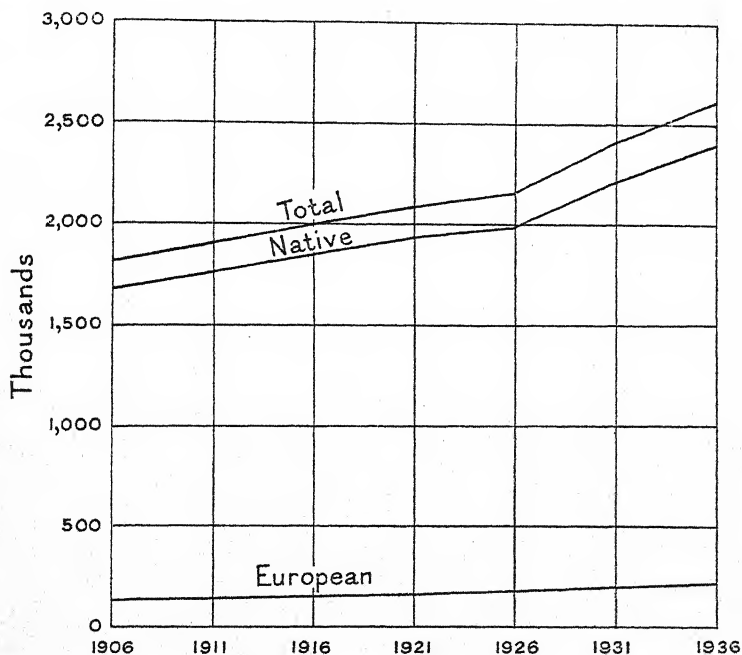


FIG. 35. *The increase of population, 1906-1936*

the last census, that of 12 March 1936, the total population (excluding the armed forces) was 2,608,313—2,395,108 natives and 213,205 Europeans: all figures given in this chapter refer to this census, except where otherwise stated. Quinquennial census returns are available since 1911 for the European population, except for the ten-year gap which included the War of 1914-1918, and since 1921 for the native population.

DISTRIBUTION OF POPULATION

Most of the population of Tunisia lives north of a line joining Thala and Sfax, and many parts of the south are very sparsely peopled. The population density of the main divisions of the country in 1936 is given in the table below: the figure for Tunisia without the Territoires militaires du Sud is very similar to that for the three departments of northern Algeria (81.4), and particularly to that of the department of Constantine (80.6).

	<i>Area</i> (square miles)	<i>Population</i>	<i>Density per</i> <i>square mile</i>
Tunisia	48,332	2,608,313	52
Tunisia (excluding Terri- toires militaires) . . .	30,571	2,415,193	79
Territoires militaires . .	17,761	193,120	10

In general there is a decrease in the density of population from north to south and from the coast inland, as illustrated in Fig. 36, which may be compared with the rainfall map (Fig. 21). Population statistics by administrative regions are given in the table on p. 189.

The most densely peopled areas (over 250 persons to the square mile) are around Tunis, Bizerta, Béja, and Zaghouan in the north, along the east coast between Sousse and Mahdia and behind Sfax, in parts of the Île de Djerba, and in the oases of the Djerid (especially Nefta, Tozeur, el Oudiane, and el Hamma). Much of the Medjerda valley, and the High Tell and the Dorsale around towns such as le Kef, Thala, Maktar, and Kairouan, have between 100 and 250 persons to the square mile: the population is usually near the higher figure where the annual rainfall exceeds 24 inches, and near the lower limit where the rainfall is between 16 and 24 inches. There are also areas with between 100 and 250 persons to the square mile in some of the oases of the south, such as Gabès and Kebili. Areas with from 50 to 100 persons to the square mile include most of the remainder of northern Tunisia, and much of central Tunisia as far south as the line joining Thala and Sfax, the Gafsa district, and the rest of the Île de Djerba. Except in the north, the rainfall is usually less than 16 inches per annum in these areas. Parts of the Dorsale have less than 50 persons to the square mile, and this density is common throughout southern Tunisia except for the areas already mentioned: the annual rainfall in these areas is seldom more than 8 inches and is often less. South of the Chott Djerid-Gabès line, and including the whole of the Territoires militaires, the population

is very small, the density rarely exceeding 15 and often being only 3 or less to the square mile.

Population of Tunisia by Regions, 1936

<i>Region</i>	<i>Total</i>	<i>Native</i>	<i>European</i>
Bizerta . . .	392,293	360,167	32,126
Tunis . . .	541,828	398,667	143,161
Le Kef . . .	306,409	297,530	8,879
Sousse . . .	630,922	617,632	13,290
Sfax . . .	543,741	528,747	14,994
Total . . .	2,415,193	2,202,743	212,450
Territoires militaires	193,120	192,365	755
GRAND TOTAL .	2,608,313	2,395,108	213,205

Native Population

The average density of the native population in northern and central Tunisia is 46.6 to the square mile, and 10.4 in the Territoires militaires. Most of the natives live near the coast, both in the north (in the Medjerda valley and around Tunis and Bizerta) and in the east (in the Cap Bon peninsula and the Sahels of Sousse and Sfax). In the south settlement is largely limited by water-supply, and the population is grouped in the oases. Many parts of the interior, where Roman and other remains bear witness to a considerable population in the past, are only sparsely peopled to-day.

Since 1921 the native population has increased in most districts. This is partly a result of the high birth-rate, and of the reduction in the death-rate and infant mortality rate through the introduction of better public health facilities and other social services: but it has also been caused by the extension of cultivation, particularly of olives and date-palms, notably in the Sahels of Sousse and Sfax and around Grombalia and Gabès. The greatest increases in population have taken place in those areas, in the Tunis and Bizerta districts, and in the Gafsa mining area: the smallest increases have been around Tabarka, Tebourouk, Medjez el Bab, Zaghuan, Maktar, and Tozeur. Although only 18 per cent. of the total native population—about 430,000—live in urban areas, there has been a considerable drift from the country to the towns in recent years: between 1926 and 1936, for example, 94,000 natives settled in the towns. Besides the drift of natives to the larger towns such as Tunis, Sfax, Sousse, and Bizerta, there are many towns with large native populations and very few Europeans. These include Kairouan and towns in the Sahel such as Msaken, Kalaa Kebira, and Moknine, and oases

such as Nefta and Tozeur. The rural population is, however, still the core of the native population, and the introduction of new

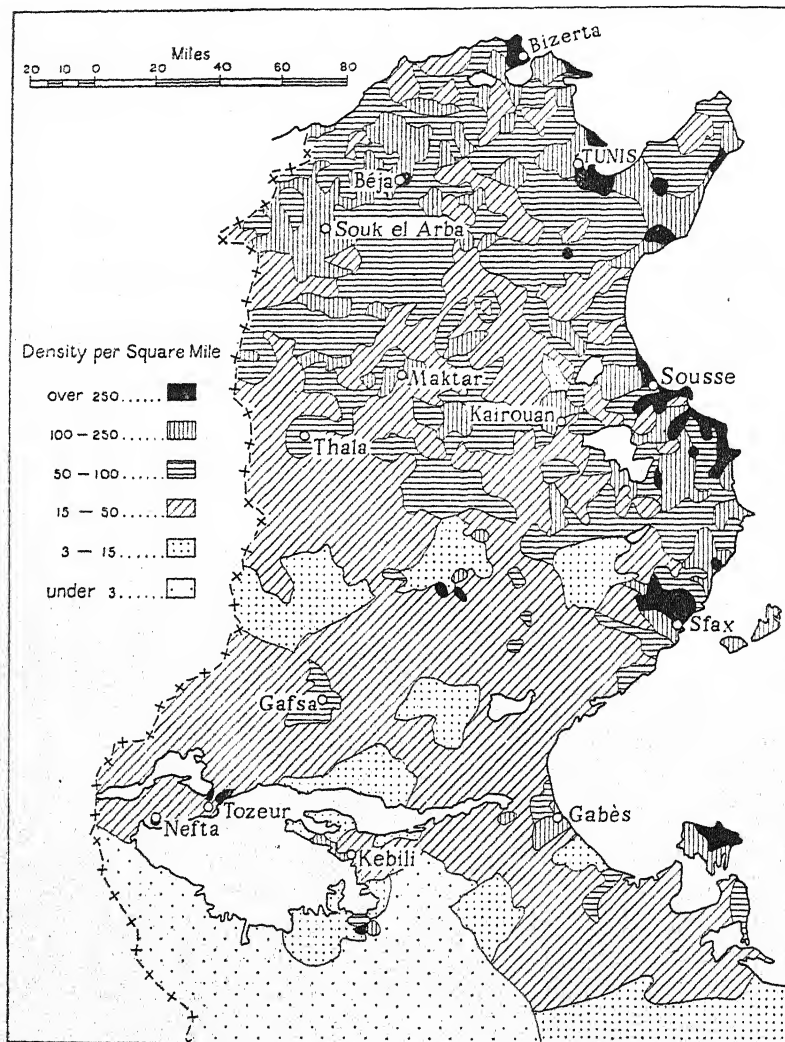


FIG. 36. *The density of population, 1936*

methods of farming and the cultivation of new lands have helped in some degree to counteract the drift to the towns. Between 1921 and 1936 the rural population increased, at first slowly and then more rapidly, from 1,627,747 to 1,963,284.

European Population

The density of the European population of northern and central Tunisia is only 7 to the square mile, and there are 11 natives to every European. In the whole of the Territoires militaires there were only 755 Europeans in 1936, a density of about 0.05 to the square mile. Rainfall and the possibilities of agriculture have been the principal factors governing European rural settlement: mining, though it plays such a large part in the country's economic life, has had comparatively little influence on the distribution of the European population.

Most of the Europeans in Tunisia live in coastal areas, particularly in and around the larger towns: thus in 1936 there were 134,054, 25,583, and 11,066 Europeans in the civil controls of Tunis, Bizerta, and Sousse respectively. Though their number in the civil control of Tunis increased by 44,460 between 1921 and 1936, Europeans accounted for less than one-half of the total population in 1936, compared with about 60 per cent. in 1921. In many civil controls there was a decrease in the European population between 1931 and 1936, largely because of the effects of the economic depression, especially in the mining industry. The decrease exceeded 1,000 in the civil controls of Gafsa and le Kef, and was over 300 in Medjez el Bab, Souk el Arba, and Zaghouan.

The Europeans in the towns occupy the leading positions in industry, commerce, public administration, and the professions. The European urban population numbered 90,270 in 1906 and had increased to 152,558 in 1936, when it represented more than 71 per cent. of the total European population: even if towns with less than 5,000 inhabitants be excluded, the figure falls only to 69 per cent. Over half of the Europeans in Tunisia—more than 110,000 persons—lived in the city and suburbs of Tunis in 1936, 98,877 in the city itself. Another 11,257 Europeans lived in Bizerta, 8,661 in Sfax, and 8,645 in Sousse, 6,851 in la Goulette, and 5,864 in Ferryville. Figures for all the principal towns are given on p. 193.

In rural areas, Europeans (particularly the French) are generally large land-owners, not smallholders, though many Italians work for French estate-owners. Their numbers increased from 38,625 in 1906 to 64,407 in 1931, and then declined, owing to the depression in Tunisian agriculture, to 60,647 in 1936: the rate of increase has been considerably slower than that of the urban population, the proportion of the rural to the total population having declined from 33.6 to 28.5 per cent. during the period 1906-1936.

Urban Population

Owing to the lack of detailed statistics it is difficult to give a complete picture of the growth of the urban and rural population since the establishment of the French protectorate, and most of the available data has been given in the preceding paragraphs. The growth of the urban population is indicated in Fig. 37: figures for the native population are only approximations prior to 1921. As already indicated,

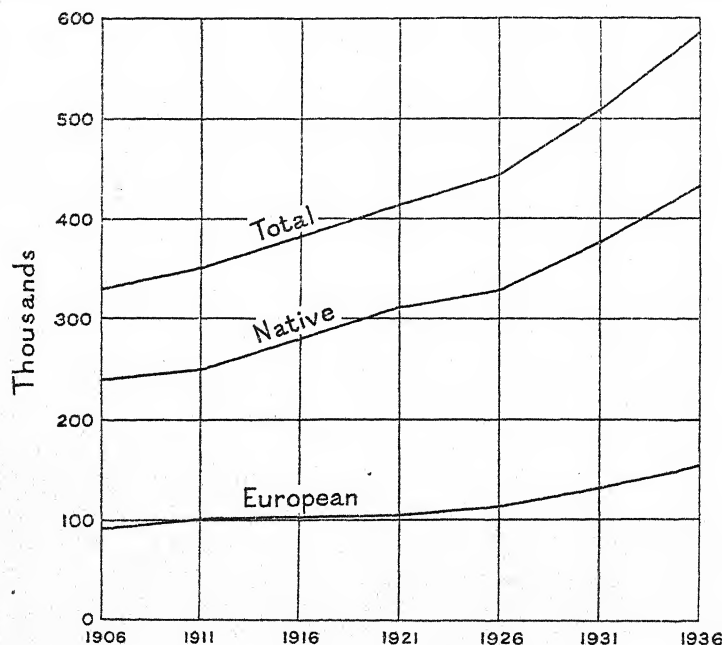


Fig. 37. *Urban population, 1906-1936*

there has been a marked tendency for both natives and Europeans to move from rural to urban areas. Between 1921 and 1936 the total number of urban dwellers increased from 413,768 to 584,384 (from 19.7 to 22.4 per cent. of the total population): the native total increased from 310,077 to 431,826 in the same period (from 16 to 18 per cent. of the total native population) and the European from 103,691 to 152,588 (from 66.4 to 71.5 per cent. of the total European population). Of the total urban population, 482,010 (341,789 natives and 140,221 Europeans) lived in the fifteen towns with more than 10,000 inhabitants: the concentration of the European urban population in these larger towns is especially striking. Included with the

natives are about 50,000 Jews who, in Algeria, are counted with the European population.

The table below gives population statistics for the twenty-nine towns in Tunisia with 5,000 or more inhabitants in 1936. Tunis alone had a population of more than 50,000: five other towns had more than 20,000 inhabitants, and nine more had between 10,000 and 20,000. It will be noted that only in la Goulette and Ferryville did Europeans form a majority of the population, and that in many towns, including some of the larger settlements such as Msaken, Kalaa Kebira, and Moknine, the European population was very small (cf. p. 189).

The Population of the Chief Towns of Tunisia, 1936

	Moslems	Jews	Total Native	French	Italians	Total European ¹	Total (Native and European)
Tunis	93,356	27,345	120,701	42,678	49,878	98,877	219,578
Sfax	31,206	3,466	34,672	5,224	2,610	8,661	43,333
Sousse	16,084	3,741	19,825	5,332	2,882	8,645	28,470
Bizerta	15,869	1,342	17,211	8,054	2,980	11,257	28,468
Kairouan	21,902	226	22,128	615	171	863	22,991
Msaken	20,046	..	20,046	42	..	43	20,088
Gabès	14,302	2,552	16,854	1,292	280	1,757	18,611
Kalaa Kebira	14,938	..	14,938	21	..	21	14,959
Moknine	13,477	651	14,128	57	14	77	14,205
Nefta	13,442	148	13,590	29	..	29	13,619
Béja	10,362	998	11,360	796	1,085	1,932	13,292
Tozeur	11,443	143	11,586	104	5	112	11,698
Gafsa	9,929	577	10,506	650	87	760	11,266
La Goulette	2,343	1,668	4,011	2,713	3,801	6,851	10,862
Monastir	10,094	142	10,236	192	81	336	10,572
Ksour Essaf	9,965	..	9,965	26	..	28	9,993
Nabeul	6,577	1,912	8,489	432	168	618	9,107
Le Kef	6,691	807	7,498	694	641	1,357	8,855
Mahdia	7,639	338	7,977	265	231	511	8,488
Menzel Temime	7,775	..	7,775	43	14	57	8,532
Djemmal	8,133	27	8,160	50	21	72	8,232
Zarzis	7,224	260	7,484	107	9	157	7,641
Mateur	5,460	332	5,792	398	1,169	1,624	7,416
Ferryville	276	190	466	4,604	1,198	5,864	6,330
El Djem	6,015	11	6,026	38	..	38	6,064
El Hamma	5,394	479	5,873	19	..	26	5,899
La Marsa	4,654	131	4,785	524	298	884	5,669
Ariana	1,832	2,619	4,451	584	383	1,079	5,330
Menzel bou Zelfa	5,186	110	5,296	18	2	22	5,318

¹ Including 'other Europeans'

The four largest towns are ports, Tunis and Bizerta serving as outlets for the Tell, and Sousse and Sfax for the olive-growing region of the Sahel and the mines of central Tunisia: Bizerta is also the chief French naval base in north Africa. Tunis, with 219,578 inhabitants, is the third city in French North Africa and ranks eighth among French towns after Paris, Marseilles, Lyons, Algiers (264,232), Bordeaux, Casablanca (257,430), and Nice. If adjoining towns such

as Ariana, le Bardo, Carthage, Hammam Lif, la Marsa, Maxula-Radès, and Sidi bou Said be included, its total population exceeds 250,000. Sfax also is surrounded by a ring of suburbs and has a population of about 100,000 with the cheikhats of Sakiet ez Zit, Merkez Kamoun, Merkez Damak, Merkez ben Halima, and Sakiet ed Dair. The steady growth of Tunis, Sfax, Sousse, and Bizerta since 1921 is indicated by the following figures:

	TUNIS			SFAJ		
	<i>Natives</i>	<i>Europeans</i>	<i>Total</i>	<i>Natives</i>	<i>Europeans</i>	<i>Total</i>
1921	98,204	73,472	171,676	21,137	5,488	26,625
1926	106,860	79,136	185,996	23,714	6,884	30,598
1931	115,200	87,205	202,405	31,792	8,177	39,969
1936	120,701	98,877	219,578	34,672	8,661	43,333
	SOUSSE			BIZERTA		
	<i>Natives</i>	<i>Europeans</i>	<i>Total</i>	<i>Natives</i>	<i>Europeans</i>	<i>Total</i>
1921	13,188	6,566	19,754	12,341	6,937	19,278
1926	14,442	6,856	21,298	13,855	6,960	20,815
1931	16,970	8,354	25,324	15,235	7,971	23,206
1936	19,825	8,645	28,470	17,211	11,257	28,468

GROWTH OF POPULATION

Vital Statistics

Few statistics are published concerning the number of births and deaths in Tunisia as a whole, and outside the city of Tunis these are reasonably reliable only for the European population: they are available only since 1911. The figures for 1936 and 1937 for Tunisia were as follows:

	<i>No. of births</i>		<i>No. of deaths</i>	
	1936	1937	1936	1937
Natives	79,715	67,182	39,509	41,869
including Moslems	77,829	65,334	38,494	40,774
including Jews	1,886	1,848	1,015	1,095
Europeans	6,046	5,870	2,926	3,179
including French	3,064	3,028	1,252	1,482
including Italian	2,739	2,523	1,448	1,372
TOTAL	85,761	73,052	42,435	45,048

For the city of Tunis the birth-rates, death-rates, and infant mortality rates (resident population only) in 1936, 1937, and 1938 were:

	1936	1937	1938
Birth-rate per 1,000	38.9	37.2	37.8
Death-rate per 1,000	25.2	25.7	25.5
Deaths under one year per 1,000 live births	149	159	149

The European birth-rate is usually lower than that of the natives, and in the periods 1911-1915 and 1916-1920 was as low as 12.8 and 11.9 per 1,000: in fact between 1911 and 1920 European deaths exceeded births by 4,326. Since 1921, however, the birth-rate has been considerably higher, always exceeding the death-rate, and was 30.5 per 1,000 in the period 1926-1930. The death-rate fell from 15.8 in 1916-1920 to 13.7 per 1,000 in 1936. The annual excess of births over deaths averages between 2,500 and 3,000, and was 3,120 in 1936 and 2,691 in 1937.

The native birth-rate has varied in recent years between 19.6 (1911-1915) and 33.2 per 1,000 (1936), and the excess of births over deaths between 118,445 in the period 1926-1930 and 40,206 in 1936. The death-rate is usually between 16 and 20 per 1,000. The native population increased by about one-third (634,000) in the 25 years from 1911 to 1936: the Moslems have increased more than the Jews because they have a higher birth-rate (33.3 and 31.7 per 1,000 respectively in 1936) and a slightly lower death-rate (16.4 and 17.0).

In the city of Tunis the birth-rates are very high, about two and a half times higher than the rates in English towns of similar size, and about 10 per 1,000 higher than the rates of the city of Algiers. The native birth-rate is particularly high (43.8 per 1,000 in 1937): the European birth-rate in the same year was 29.1. The death-rates are slightly more than double those of large English towns and from 7 to 10 per 1,000 higher than those of Algiers: they are comparable with the figures for Alexandria and Cairo. The excess of births over deaths is approximately 12 per 1,000 per annum.

The infant mortality rates are about three times greater than those of the more advanced countries of western Europe, though they do not compare unfavourably with those of other north African cities.

The more common diseases and causes of death are described in Chapter VI.

Information regarding marriage is available only for marriages in which at least one of the persons is European. In 1937, 998 marriages between Europeans were recorded and 129 between Europeans and natives (including 35 between Europeans and Jews).

Increase of Population

The population has increased from about 1,500,000 in 1881 to 2,608,313 in 1936: the increase since reasonably accurate figures were available is illustrated diagrammatically in Fig. 35. The most striking

inter-censal increase in the European population took place between 1926 and 1931 (22,012): in contrast there was an increase of less than 8,000 in the 10-year period 1911-1921, which included the War of 1914-1918 when there was an excess of deaths over births (p. 195). The native population has increased by at least 175,000 in each inter-censal period, except between 1921 and 1926 when the increase was only 43,603: this period was immediately followed by the greatest increase (228,972 between 1926 and 1931). More detailed information regarding the various elements of the population is given below (pp. 196-203).

Immigration

In the early days of the Protectorate immigration was the essential means by which the European population increased. Owing to the preponderance of Italians, the French encouraged their own nationals in particular to settle in Tunisia, and between 1896 and 1906 there was considerable immigration from both metropolitan France and Algeria: altogether Tunisia has nearly 10,000 French citizens who were born in Algeria. Since the War of 1914-1918, however, the number of immigrants has declined, the Italians especially since about 1930, when they went as colonists to Libya and, later, to Abyssinia instead of to Tunisia. The increased European population in Tunisia in the last twenty years has been due mainly to the growing number of Europeans born in the country. There is little immigration of natives except for the migration of nomadic and semi-nomadic tribes across the Algerian and Libyan borders, and the seasonal movements of labourers.

Emigration

Apart from the small scale seasonal movement of semi-nomadic tribes into the adjoining parts of Algeria and Libya there is almost no emigration from Tunisia, and nothing comparable with the extensive movement of the Kabylie peoples from Algeria to metropolitan France.

ELEMENTS OF THE POPULATION

Natives

The natives have constituted over 90 per cent. of the total population of Tunisia since the first complete census of 1921. Jews are included with the native population because they can become French

citizens only by naturalization. In 1921 there were 1,937,824 natives (including 47,640 Jews); in 1926, 1,986,427 (54,343 Jews); in 1931, 2,215,399 (56,245 Jews); and in 1936, 2,395,108 (59,485 Jews) (Fig. 35). Thus in each five-year period there has been an increase in the native population and in both its Moslem and Jewish elements: the increases were at first small, and then greater owing to the increasing excess of births over deaths.

Moslems. Tunisian-born Moslems are predominantly of Berber stock, but successive Arab invasions and the passage of time have made it difficult to distinguish between Arabized Berbers and Berberized Arabs (cf. p. 145; Fig. 29). Moslems of foreign origin are included with those born in Tunisia for census purposes, and there are no marked differences between them. Most of them come from Algeria and Libya (Tripolitania): they include a number of nomadic herdsmen and temporary labourers. There is also an increasing number of Moroccan Moslems, and a few from Syria and the Sudan. The figures for 1931 and 1936 were as follows:

<i>Moslems</i>	1931	1936
Tunisian . . .	2,086,762	2,265,750
Algerian . . .	40,734	40,816
Tripolitanian . . .	28,157	23,907
Moroccan . . .	2,854	4,446
Syrian . . .	140	212
Sudanese . . .	445	307
Others . . .	59	185
Total Moslems . . .	<u>2,159,151</u>	<u>2,335,623</u>

Jews. Jews have lived in Tunisia for many centuries and, for most purposes, may be counted with the Moslem population, from which they differ little apart from religion and dress. Many Tunisian Jews, who are very pro-French, feel strongly that they should be counted with the Europeans as is the case in Algeria, where all Jews were naturalized by a decree of 1870.

The Jews increased from 47,640 in 1921 to 59,485 in 1936. More than half of them (32,384 in 1936) live in the civil control of Tunis, 27,345 in the urban area alone. They are relatively numerous in the Île de Djerba (4,109), where they are mainly concentrated in the towns of Hara Kebira and Hara Seghira, and in the civil controls of Sousse (4,990), Sfax (3,579), and Gabès (3,061). In the interior there are comparatively few Jews, and there are only 2,809 in the Territoires militaires, mostly in Médenine and Fom Tatahouine. Over 50,000 (about 84% of the total) live in towns of over 5,000 inhabitants, and all the larger towns have considerable Jewish

colonies, especially Gabès, where they live in a separate quarter. Eight towns have more than 1,000 Jewish inhabitants—Tunis, Sousse, Sfax, Ariana, Gabès, Nabeul, la Goulette, and Bizerta.

In contrast to the Moslem population with its considerable foreign element, there are less than 250 Jews of foreign origin. Most of them are from Libya (Tripolitania) (167), with a few from Algeria, Morocco, and Syria: they live chiefly in the civil controls of Tunis, Sfax, and Sousse.

Europeans

The European population, for which comparatively detailed and reliable statistics are available since 1901, accounts for only about 8 per cent. of the total population, and is remarkable for the high proportion of foreigners. In 1936 there were 213,205 Europeans compared with 195,293 in 1931, an increase of 17,912. The composition of the population in 1931 and 1936 was as follows:

	1931	1936
French	91,427	108,068
Italian	91,178	94,289
Maltese	8,643	7,279
Spanish	449	323
Greek	463	454
Other Europeans	3,133	2,792
TOTAL	<u>195,293</u>	<u>213,205</u>

In the early days of the French protectorate the growth of the European population was fairly rapid, but it slackened off during the War of 1914-1918, the increase between 1911 and 1921 (7,639) being the smallest figure yet recorded (cf. Fig. 38). Colonization was at first concentrated mainly around the towns of Tunis, Bizerta, Sousse, and Sfax, with limited settlement in the Sahel, along the northern coast around Tabarka, and in areas where water was relatively abundant and cultivation possible without irrigation, as around Béja and Massicault. The colonists then spread gradually from the coastal districts to the plains of the interior near Depienne (Smindja), Zaghuan, and Ghardimaou, to the Cap Bon peninsula especially around Grombalia, and finally into certain upland districts such as Goubellat, Bou Arada, and le Kef, where their superior farming methods enabled them to cultivate land used only as pasture by the natives. The colonization villages were grouped about water-points—springs and wells—on valley slopes, generally avoiding marshy river banks because of the dangers of flooding and malaria (cf. Fig. 27). Easy means of road or rail communication attracted European colonists,

whereas the natives generally preferred to live in more isolated districts: thus in the north there are areas of colonization in the Medjerda valley and its tributaries which are often separated by considerable mountain tracts inhabited almost entirely by natives.

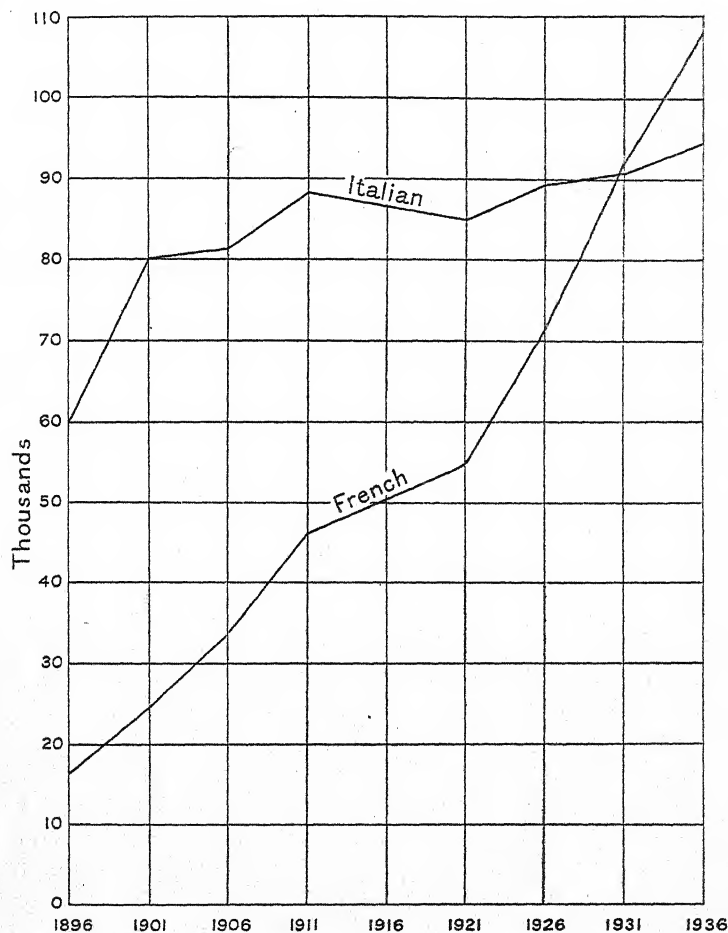


FIG. 38. *French and Italian population, 1896-1936*

French. The position of the French has altered considerably since the establishment of the Protectorate. Before 1881 there were about 3,500 French and 10,000 Italians in Tunisia. Since then there has been a progressive increase except for the period of the War of 1914-1918, when a number returned to France for war service: thus

between 1911 and 1921 the increase was only 8,432 compared with 21,843 between 1901 and 1911, and 36,950 between 1921 and 1931. The French were equal in number to the Italians for the first time in 1931, and outnumbered them by 13,779 in 1936: this has arisen partly as a result of the naturalization policy of the administration. The growth of the French population, which now forms 50·7 per cent. of the total number of Europeans, is illustrated in Fig. 38.

The number of Frenchmen born in Tunisia has increased considerably from 30 per cent. in 1911 to 36 per cent. in 1921 and 52 per cent. in 1931; meanwhile the number of Frenchmen in the country who were born in France has diminished from 29 per cent. in 1926 to 25 per cent. in 1931. The number of Frenchmen of Algerian birth resident in Tunisia has remained fairly constant (12% in 1926 and 10% in 1931). Of the French population of 91,427 in 1931, 48,434 had been born in Tunisia, 23,254 in metropolitan France (excluding 4,380 born in Corsica), and 9,865 in Algeria.

Corsica has provided more emigrants to Tunisia than any other part of France, followed by the Midi (particularly the department of Bouches du Rhône), the department of Seine, and the departments of the south-east (Aude, Gard, Var, and Isère). Considerable numbers of fishermen and sailors have come from Finistère; Ferryville has a large proportion of Bretons. Very few persons from the departments of the west, centre, and north, with the exception of Seine, have settled in Tunisia.

Division according to sex, age, and civil status of the French in Tunisia is interesting, because, unlike most 'new' countries, there are more women than men (47,294 and 44,133 respectively in 1931); this is partly explained by the fact that the families of military personnel are counted, while the men are not. The predominance of young people is another striking feature; in 1931 there were 28,834 children under 15 years of age, 44,199 between 15 and 45, and only 17,394 over 45 years of age. In the same year there were 47,641 single, 38,672 married, 4,484 widowed, and 630 divorced persons.

Distinction should be made between those who are French by birth (65,577 in 1931) and those who are French by naturalization or marriage (25,850). As a result of recent legislation (p. 142) naturalization of foreigners applies only to persons whose parents were born in Tunisia—except for voluntary naturalization. In 1921 only 5·8 per cent. of the French population was French by naturalization, marriage, or option, but this figure had increased to 28·2 per cent. by 1931.

The occupations of the French population in Tunisia in 1931 are given in the following table, which should be compared with the figures for the Italian population on p. 202:

	<i>Number</i>	<i>Percentage of total population</i>
Agriculture	9,951	11.0
Commerce	14,794	16.1
Industry	18,595	20.3
Transport	11,407	12.5
Public administration	18,499	20.2
Police	1,934	2.0
Liberal professions	3,302	3.6
People of independent means	2,025	2.2
Unclassified	10,920	12.1

There is no French peasant class in Tunisia, those persons engaged in agriculture being mainly large landowners. Most of the French live in the towns and are in government service, industry, or commerce. In 1936 five towns accounted for 65,500, or 61 per cent., of the total French population; they were Tunis (42,678), Bizerta (8,054), Sousse (5,332), Sfax (5,224), and Ferryville (4,604). Elsewhere they are fairly widely scattered throughout the country, except the south and west, numbering about 1,000 in each civil control.

Italians. In 1881 the Italians, estimated at about 10,000, far outnumbered any other nationality among the European population. Since then they have increased gradually from 60,000 in 1896 to 94,289 in 1936, as shown in Fig. 38, but not as rapidly as the French. Between 1911 and 1921 there was a decrease of 3,383, but this was followed by an increase of 4,417 in the inter-censal period 1921-1926. In recent years the French total has overhauled that of the Italians, though the latter disputed the figures of the census of 1936. This relative decline can be explained by the departure of Italians to Libya and Abyssinia, by the cessation of Italian emigration, by mixed marriages notably between French and Italians, and by a certain amount of naturalization. Under the conventions of 1896, however, only individual Italians can apply for naturalization (cf. p. 141).

Of the present Italian population, 56,000, or nearly 60 per cent., were born in Tunisia and over 38,000 in Italy. About 29,000 of the latter came from Sicily, 3,000 from Pantelleria, and the remainder from other parts of southern Italy and Sardinia.

Italians are irregularly distributed throughout the country. In the civil controls of Tunis, Grombalia, and le Kef they are more numerous than the French and form the majority of the European population. In 1931 they were also slightly in the majority in the

civil controls of Béja and Zaghouan, and were fairly numerous around Bizerta, Mateur, Sousse, and Sfax; there were a few Italians in parts of the south and the interior. Of the eleven towns with more than 1,000 European inhabitants, only four had a majority of Italians in 1936—Tunis (49,878), la Goulette (3,801), Mateur (1,169), and Béja (1,085).

The table below gives the occupations of the Italian population in 1931. The proportion of people engaged in agriculture is higher than among the French, many of the Italians being small farmers or labourers working on estates owned by Frenchmen. Still more striking is the number of Italians engaged in industry, mainly as labourers: the French, in contrast, are mostly at the head of business enterprises.

	<i>Number</i>	<i>Percentage of total population</i>
Agriculture	16,388	18.1
Commerce	11,836	12.9
Industry	47,882	52.5
Transport	3,570	3.9
Liberal professions	1,777	2.0
Unclassified	9,725	10.6

In spite of the close relationship of Italians and French in Tunisia over a number of years the Italians have maintained their own doctors, lawyers, schools, teachers, and banks, and their own patriotic, sporting, musical, and philanthropic clubs and societies. They have also had a powerful Chamber of Commerce, and the Italian consuls have been active to emphasize the independence of the Italian community. Everything possible has been done to bind the Italians more closely to their mother country and to resist the attempts of the French administration to assimilate them. As a result the position of the Italian minority in Tunisia is very different from that of the large Spanish population of the department of Oran in Algeria.

Maltese. The Maltese are the most numerous of the other foreign elements in Tunisia. Owing to overcrowding in Malta they migrate to Tunisia, where they become small traders and manual workers in Tunis and other coastal towns; only a few rise to be rich businessmen or industrialists. In 1936 they numbered 7,279—1,364 fewer than in 1931, and nearly 6,000 fewer than in 1921: this decline is due to increased naturalization, and to the fact that, as in Algeria, they are easily assimilated. Nearly seven-eighths of the Maltese live in the towns, notably in Tunis (4,855) and the other ports.

Greeks. The numbers of Greeks have remained constant between the last two censuses: there were 463 in 1931 and 454 in 1936. They live mainly in the south, especially in Sfax (273) and in Tunis (117), and are mostly engaged in fishing and sponge-fishing.

Spanish. The Spanish numbered only 449 in 1931 and 323 in 1936. They live mainly in Tunis (138), Sousse (51), Bizerta (28), and Sfax (22), where they are employed as small traders or manual workers.

Other Europeans. These comprise a small number of various nationalities. More than half (1,927) live in the towns of over 5,000 inhabitants, mainly in Tunis (1,201), Gabès (106), and Sfax (105), but they also live in scattered localities in the civil controls of Tunis (1,619), Bizerta (179), Kairouan (101), TebourSouk (128), and Sousse (105).

GAZETTEER OF TOWNS

THE gazetteer includes all the towns of Tunisia with a population of 5,000 or more (listed on p. 193) and all the headquarters of the civil controls (cf. Fig. 31), whatever their size. In addition, Médenine, the headquarters of the Territoires militaires, and some of the smaller oases of the south, such as Kebili, are included. The towns are listed in alphabetical order. The names of the ports are also given in the appropriate place with references to the pages on which they are described in Chapter XI. The approximate location and size of all the places in the gazetteer are shown in Fig. 39.

Much of the information given in the heading of each town is based on the directory *Didot-Bottin, Annuaire du Commerce* (Paris, 1939). The population statistics are, wherever possible, those of the census of 1936: an analysis of the figures for the towns with more than 5,000 inhabitants is given in the table on p. 193. Details relating to administration, police, justice, &c., are given in Chapter IX. Communications are described in Chapters XV–XVII. Roman Tunisia is described in Appendix C.

ARIANA. Population 5,530 (1,079 Europeans). Altitude 36 feet.

Brigade de gendarmerie. Electricity (3-phase, 115/200). Garages (2).

Ariana stands in the Plaine de la Soukra, which extends from the Lac de Tunis to the Sebkret er Riana. It is $4\frac{1}{2}$ miles north of Tunis, and is often regarded as one of the city's suburbs. To the north-west Djebel Amar, which trends in a north-south direction from the

western end of the Sebket er Riana, rises fairly rapidly to a height of 774 feet. Ariana is surrounded by gardens, orchards, and olive



FIG. 39. *The towns and ports of Tunisia*

groves which extend towards la Marsa and Carthage; on the more sandy soils by the shores of the sebkha there are some vineyards.

Ariana is noted for its agreeable climate, which is suitable for people suffering from pulmonary diseases. It is a favourite resort of the Jews of Tunis, and was once famed for its Hafsite palace of Abu Fehr. A fruit and vegetable market is held daily. Cattle are reared in the district.

Communications

Rail: Ariana is connected with Tunis by an electric tramway.

Road: There is a secondary road from Tunis to Ariana.

BÉJA (Photos. 7, 124, 125). Population 13,292 (1,932 Europeans). Altitude 820 feet. Chief town of a civil control and a caïdat. Brigade de gendarmerie. Electricity (3-phase, 110/190). Infirmary-dispensary. Hotels (3). Garages (6).

Béja stands on the north-west to south-east transverse route across northern Tunisia where the Oueds Sersar and Béja form a gap through the Monts de la Medjerda. It is 28 miles south-east of Tabarka and 53 miles south-west of Bizerta. The town lies on the southern flank of the mountains and on rising ground 2 miles west of the Oued Béja, one of the left-bank tributaries of the Medjerda. To the south the land falls gradually for nearly 5 miles to the Medjerda valley, but north-westward the slopes of Djebel Diss rise fairly steeply to a height of 1,413 feet and then continue to rise northward to the main mountain ridge. To the east, across the Oued Béja, are some hills between 950 and 1,100 feet in height.

The Phoenician and Roman town extended over a much greater area than the medieval town, which was built on steep slopes and huddled within the Byzantine walls, remains of which may still be seen, together with its towers and gates. The Kasba or Byzantine citadel, which commanded the whole of the eastern Kroumirie, has been dismantled and replaced by large barracks. The modern town, with its markets, shops, mosques, and zaouias, has spread down the hill-slopes in two suburbs towards the station. In the Mzara suburb are some ancient grottoes which are still inhabited. The principal mosque was originally a Christian basilica built in the form of an Egyptian cross. About $5\frac{1}{2}$ miles to the west there are the ruins of another Christian basilica at Henchir Rhiria. There is an agricultural experimental station at Béja, and the market, held on Tuesdays, specializes in cereals and early vegetables. The water-supply of the town comes from springs.

Béja stands on the site of the ancient Vaga, which was an important

market centre when conquered by Metellus in 109 B.C., and was even more prosperous when made a Roman colony in A.D. 197. It was sacked by the Vandals, but restored in the sixth century by Justinian, who erected the walls which did not enclose a large portion of the south-eastern part of the Phoenician and Roman town. After its conquest during the Arab invasions the basilicas in the town were transformed into mosques.

Communications

Rail: Béja is on the normal-gauge line from Souk Ahras in Algeria to Bizerta. The station is on the eastern side of the town.

Road: Béja is the centre of a number of roads, the principal being that from Souk Ahras through Souk el Arba which passes through the town to Medjez el Bab and Tunis, and the road from Nefza on the Tabarka-Bizerta road.

BIZERTA (BIZERTE), *see* p. 236.

DJEM, EL (Photos. 85, 87). Population 6,064 (38 Europeans).

Altitude 367 feet. Brigade de gendarmerie. Dispensary. Hotels (2).

El Djem is midway between Sousse and Sfax, about 38 miles from each town. It lies in the centre of a monotonous, level plain, with fields separated by hedges of cactus, where the great amphitheatre, 485 feet by 400 feet with a circumference of about 1,200 feet, dominates the landscape for miles around. The town is surrounded by gardens, and is the centre of an olive-growing district for which it was famous even in Roman times. The Arab village, with narrow and squalid streets, is huddled at the southern end of the amphitheatre, which is one of the most impressive Roman monuments in north Africa. Other Roman ruins include a circus to the north-east of the town, six reservoirs and the remains of baths to the west, and a smaller but older amphitheatre to the south. The Roman cisterns have been restored and are used to-day.

El Djem is the ancient Thysdrus, an unimportant Roman settlement until it became a colony under the Empire. During the third century it was one of the richest cities in north Africa, owing its prosperity almost entirely to its trade in olives. The great amphitheatre is supposed to have been built by the Emperor Gordian the Elder (A.D. 236). According to tradition it was turned into a fortress where the Berber heroine Kahina took refuge in 689 and withstood a long siege. After the siege it suffered some destruction, but was still

almost intact in the seventeenth century: since then its stones, columns, and arches have been used to furnish the houses of the village.

Communications

Rail: El Djem is on the narrow-gauge railway from Tunis and Sousse to Sfax and Gabès. The station is on the south-eastern side of the town.

Road: The main road from Sousse to Sfax passes round the outskirts of the town, and secondary roads lead north-west to la Smala des Souassi and north-east to Ksour Essaf and the port of Mahdia.

DJEMMAL. Population 8,232 (72 Europeans). Altitude 131 feet. Electricity (3-phase, 220/380).

Djemmal is in the Sahel of Sousse, 12 miles south-east of Msaken and 8 miles west of Moknine. The population consists almost entirely of natives engaged in agriculture. North-east, east, and south-east of the town there are hills between 250 and 300 feet in height, but to the west the land drops to the valley of the Oued Melah, which flows northward to a salt marsh. The town is surrounded by olive-groves on all sides except the north-west. It is built on the ruins of an ancient town, remains of which have been discovered 20 to 25 feet below ground. A market is held on Fridays. The water-supply is from wells. The industries include the making of bricks, tiles, and plaster, and the manufacture of olive-oil.

Communications

Rail: Djemmal is on the Msaken-Mahdia branch of the narrow-gauge line from Tunis to Sfax and Gabès, and is the nearest railway station to the port of Monastir, 13 miles distant. The station is about 300 yards north of the town.

Road: A secondary road leads west through Menzel Kamel to the Sousse-Sfax main road at Bourdjine, and other roads lead east to Moknine, south-west to Zeramedine, and north-east to Monastir.

DJERBA (HOUMT SOUK, HUMT SUK), *see p. 275.*

EL DJEM, *see Djem, el (p. 206).*

EL HAMMA, *see Hamma, el (p. 210).*

FERRYVILLE (Figs. 43, 44; Photo. 9). Population 6,330 (5,864 Europeans). Altitude 82 feet. Electricity (3-phase 110/190; D.C. 110/220). Hospital. Infirmary-dispensary. Fire brigade. Hotels (9). Garages (4).

Ferryville is a modern town about half a mile west of the naval dockyard and arsenal of Sidi Abdallah in the south-western corner of the Lac de Bizerte. It is about 9 miles from the sea at Bizerta and occupies part of the narrow strip of land separating the Garaet Achkel from the Lac de Bizerte. Immediately north-west is Henchir el Ksiba, a small hill rising to 253 feet: to the south-east is the isolated hill, Djebel Kechabta, overlooking the southern side of the Lac de Bizerte.

Fifty years ago there were no houses on the site of the present town, which is laid out on a regular plan and has an almost entirely European (mostly French) population. Most of the inhabitants are employees of the naval dockyard and arsenal (about 1,500 in 1939) and their families. Sidi Abdallah, which was planned by Admiral Merleaux-Ponty, who died in 1902, is described as part of the port of Bizerta on pp. 242-243. North of the town is a small explosives harbour, and between this and the arsenal a naval and military quarter has grown up during recent years. The Sidi Abdallah naval hospital is at Ferryville.

Communications

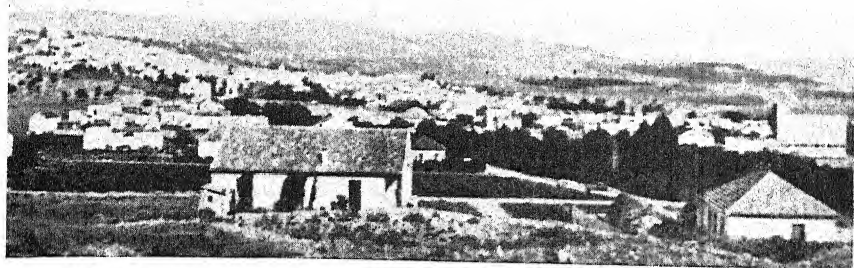
Rail: Ferryville and Sidi Abdallah are served by a branch line from Tindja on the normal-gauge line from Bizerta to Mateur.

Road: There is a short road connexion to the Bizerta-Mateur-Tunis and Bizerta-Ain Faouar-Tunis roads: another road passes between the Lac de Bizerte and Djebel Kechabta to the direct road from Bizerta to Tunis through Protville.

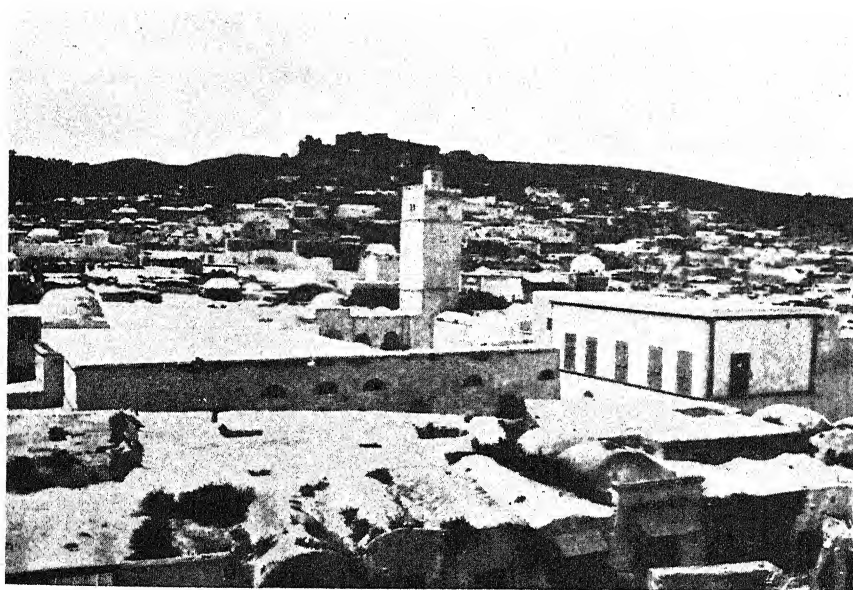
GABÈS (QABES), *see* p. 272.

GAFSA (Photos. 28, 126, 127). Population 11,266 (760 Europeans). Altitude 1,122 feet. Chief town of a civil control and a caïdat. Brigade de gendarmerie. Electricity (3-phase, 110/190). Infirmary-dispensary. Meteorological station. Hotels (2). Garages (2).

Gafsa is 113 miles south-west of Sfax and 82 miles north-west of Gabès. It stands on a rise in the centre of a gap between two ridges, through which flows the Oued Baiech. Djebel Orbata reaches a height of 3,747 feet about 10 miles to the south-east, and to the north-



124. *Béja*



125. *Béja*



126. *Gafsa*



127. *Gafsa: the Kasba*

west the town is sheltered by the two parallel ridges of Djebel ben Younes and Djebel Guetar, which rise to 2,953 feet. Koudiat Assalah, an elongated hill 1,335 feet high, running in a north-south direction, is about 1 mile north of Gafsa near the confluence of the Oued el Kebir and the Oued Sidi Aich, which flow from the north-west and north-east respectively. North-east of the town there is an expanse of sand-dunes.

The town of Gafsa on the right bank of the Oued Baiech is entirely native in character: its centre is the Place de la Kasba, to the north-east of which is the Jewish quarter. The only buildings of interest are the Great Mosque or Djama Sidi Yakoub, an ancient structure of great size, and the Kasba, built in the fifteenth century, probably on Byzantine or earlier foundations. In one corner there are several strong thermal springs (77° F.) which are carried away through a tunnel to the Jewish bath. There are some other hot springs in Gafsa, which feed several ancient piscinas (Arabic *termid*) still used as baths and washing-places. The total flow of these springs is 132 gallons a second.

The modern settlement of Gafsa-Gare has grown up near the railway station, about 2 miles south-west of the old town and at a height of 984 feet, on the left bank of the Oued Baiech. Unlike the native town, its streets are straight and intersect at right angles. A market is held daily in both places. In Gafsa *guetifs* (carpets), *haoulis* (covers), and *ferrachias* (blankets) are manufactured: in Gafsa-Gare there are some alfa workshops. Phosphate is mined extensively in the surrounding district by the Compagnie des Phosphates et du Chemin de fer de Gafsa (p. 317).

Round the town is an oasis watered by the Oued Baiech and covering nearly 4 square miles with more than 75,000 date-palms. These trees are not very productive, but the other fruit-trees, including apricot, peach, almond, pomegranate, orange, lemon, and fig, yield exceptionally fine fruit. Below these trees vegetables and cereals are grown, and beyond the gardens of the oasis there are extensive olive-groves.

Capsa, the ancient Gafsa, was destroyed by Marius in the war against Jugurtha in 106 B.C., but was restored and made a colony by Trajan. Solomon, one of Justinian's generals, enclosed the town by a wall in about A.D. 540, when it was given the name of Justiniania. The Kasba was built by the Hafsites, under Abu Abdullah Mohammed, in 1454. Dragut, a general of Khair ed Din, unsuccessfully besieged Gafsa in 1551, but captured the town five years later.

Communications

Rail: Gafsa is served by the narrow-gauge line from Tunis and Sfax to Tozeur. The station is at Gafsa-Gare, from which a short branch line runs south to le Mdilla.

Road: The main road from Fériana to el Guettar and Gabès passes through Gafsa, and other roads lead west to Tamerza, south-west to Philippe-Thomas, south to le Mdilla, and north-east to Lessouda.

GOULETTE, LA, *see* p. 244.

GROMBALIA (PEYROUTON). Population 3,085 (812 Europeans). Altitude 154 feet. Chief town of a civil control and a caïdat. Brigade de gendarmerie. Electricity (3-phase, 220/380). Infirmary-dispensary. Hotels (4). Garages (3).

Grombalia is 22 miles south-east of Tunis, on the western side of the marshy valley of the Oued el Melah and the Oued el Djourf. These streams flow into the Golfe de Tunis and separate the mountainous region of north-eastern Tunisia from the base of the Cap Bon peninsula. The town is surrounded by undulating country covered with vineyards and olive-groves, but to the west and south-west the wooded and scrub-covered ridges of Djebels es Srai (1,936 ft.), Makki (2,100 ft.), and Ressay (2,756 ft.) rise fairly steeply. The town lies to the east of the Oued Terboune, a tributary of the Oued el Melah with headstreams in Djebels es Srai and Makki. Grombalia is a modern town laid out on a rectilinear plan with straight streets. It has a considerable Italian population. Its name was changed to Peyrouton in 1936. Water is obtained from springs. A market is held on Mondays.

Communications

Rail: The town is served by the narrow-gauge railway from Tunis to Sousse, Sfax, and Gabès.

Road: The Tunis-Gabès main road passes through Grombalia; at Turki, south of the town, there is a branch to Nabeul; a secondary road passing through la Cebala du Mornag also leads to Tunis. Another secondary road goes north-east to Menzel bou Zelfa.

HAMMA, EL. Population 5,899 (26 Europeans). Altitude 197 feet. Hotels (2).

El Hamma, often known as el Hamma de l'Arad to distinguish it

from el Hamma du Djerd (north of Tozeur), is 19 miles west of Gabès. It stands in an oasis at the edge of the marshes fringing the southern end of the Sebkret el Hamma, the easterly prolongation of the Chott el Fedjadj. The Oued el Hamma, which rises in the hills to the south, passes west of the town to enter the Chott. About 4 miles to the west is the northern end of Djebel el Aziza, a steep-sided hill about 985 feet high, which curves to the south-west and continues in that direction as Djebel Tebaga at heights of over 1,300 feet. Djebel Halouga (696 ft.), which trends to the south-east, is on the opposite side of the Oued el Hamma valley, 2 miles south of the town. To the east there are hills between 500 and 660 feet high, separated by stony watercourses. South and west the steppe, which is grazed by sheep and horses, occasionally gives place to stretches of sand-dunes.

The population is grouped in several villages in the oasis: el Ksar to the east, Debdaba to the south-east, Sembat to the south-west, Bou Atouch to the west, and Bechima to the north-west. The town was known to the Romans as *Aquae Tacapitanae*, and owed its prosperity to the numerous slightly sulphurous thermal springs which gush forth with a temperature of 117° F.; the largest is used to supply the old baths. There is an annual pilgrimage in December to the tomb of a Jewish saint, Rabbi Si Youssef. Dates and cereals are the principal products of the oasis.

Communications

Road: The road from Gabès to Kebili, Tozeur, and Nefta passes through el Hamma. Another road leads north to the main road from Gabès to el Guettar and Gafsa. There is a track leading south to Matmata and Médenine.

HOUMT SOUK (HUMT SUK, DJERBA), *see* p. 275.

KAIROUAN (Fig. 40; Photos. 32, 33, 99, 116-121, 128-132). Population 22,991 (863 Europeans). Altitude 164 feet. Chief town of a civil control and a caïdat. Brigade de gendarmerie. Electricity (3-phase, 110/190). Infirmary-dispensary. Meteorological station. Hotels (5). Garage.

Kairouan is 37 miles south-west of Sousse and 104 miles south of Tunis. It is in the centre of a monotonous, level plain, resembling a semi-desert, but subject to serious floods when the Oueds Zeroud

and Merguellil overflow. Numerous watercourses cross the plain, some flowing into the marshes 5 miles east of the town and others reaching the Sebkha de Sidi el Hani $9\frac{1}{2}$ miles farther east. About 8 miles to the west Djebel Battene rises abruptly to a height of about 558 feet, and 5 miles farther west are the first hills of the Maktar range, Djebels el Afair (1,443 ft.), Hogaf es Sféia (732 ft.), and Merabtiha (640 ft.).

Kairouan is one of the most interesting cities of north Africa and a holy city for Moslems, seven pilgrimages to Kairouan being equivalent to one to Mecca. The old Moslem town or Medina covers an irregular quadrilateral area little more than 1,000 yards by 500 yards, and is surrounded by a crenellated brick wall built in 1052 and restored between 1706 and 1712. The wall, which is about 20 feet high, has towers and bastions, and is pierced by five gates. There are twenty-three mosques and ninety zaouias in Kairouan, nearly all in the old town. The most outstanding is the Great Mosque or Djama Sidi Okba in the north-eastern corner of the old town (Photos. 118-120): this is not the original built by Sidi Okba, for several mosques have been built and destroyed on the same site; the present one is the fifth, with parts of it dating from the tenth century. The Djama Tleta Biban, built in the ninth century, is one of the oldest mosques. The souks date from the seventeenth century and have been rebuilt several times: in them leatherwork, brass-ware, and carpets are manufactured and sold. The carpets are of three types: zerbia or coloured, alloucha with neutral shades, and mergoum, a cross-hatch in wools of different shades. About 1,000 people, mostly women, are employed in their manufacture, and a carpet fair is held annually in April.

Of the suburbs outside the old town, the western (Gueblia) and the two north-western (Djeblija and Zlass) are inhabited almost entirely by natives. In these quarters are the Kasba, now a barracks, and two of the principal mosques, the Zaouia de Sidi Sahab, north-west of Zlass, built about 1160, and the Djama Amor Abbada near the Bab Djedid. To the north are two uncovered circular reservoirs, the Bassin des Aghlabites, 420 feet in diameter, and a smaller, 108 feet in diameter, built in the ninth century. To the west is the Bir el Bey reservoir (Photo. 132).

The southern or European suburb lies between the old town and the railway station. It centres on the Place Carnot, around which the Town Hall and various public buildings and hotels are built. In the eastern part is the Msalla, or place of public prayer, built above

some cisterns, and on the western side is the Zaouia Sidi ben Aissa. A cattle market is held daily. The town's water-supply comes from wells to the west and south of the town, and by an aqueduct from Cherichera, 15 miles to the west.

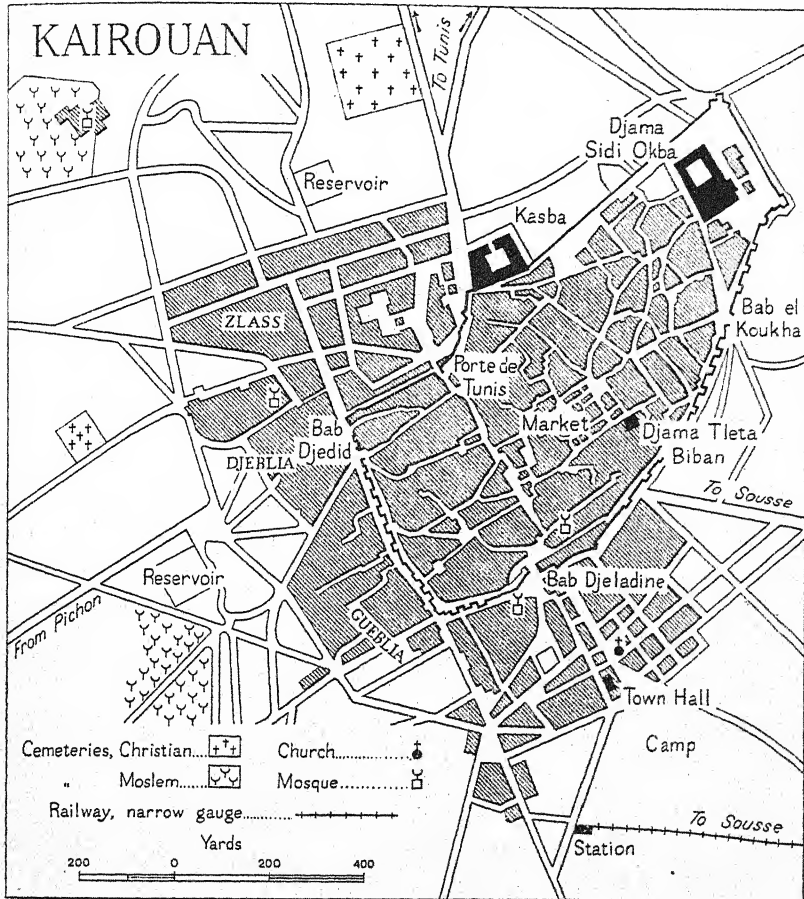


FIG. 40. *Kairouan*

Kairouan, which means 'caravan' or 'resting-place', was founded by Okba ben Nefi (Sidi Okba) in A.D. 670, roughly in the centre of Tunisia. Its purpose was to serve as a camp and as a centre of Islam. The city suffered in several wars, but prospered during the tenth century under the Aghlabites until its almost complete destruction by the Hilalians in 1048. It then lost its pre-eminence except as

a holy city, until the Turks restored some of its prosperity. The town was occupied by the French without resistance in 1881.

Communications

Rail: Kairouan is served by a short branch line from Ain Ghrasésia on the narrow-gauge line from Sousse to Metlaoui and Tozeur. The station is on the southern side of the town.

Road: Kairouan is an important road-centre with main roads leading north-east to Enfidaville and Tunis, east to Msaken and Sousse, and west to Pichon, Maktar, and Kasserine. There are also numerous secondary roads to the surrounding villages.

KALAA KEBIRA. Population 14,959 (21 Europeans). Altitude 197 feet. Electricity (3-phase, 220/380). Garage.

Kalaa Kebira is $6\frac{1}{2}$ miles north-west of Sousse and 4 miles inland from the coast. It is one of the several large villages of the Sahel of Sousse inhabited almost entirely by natives. The surrounding country, which is covered with olive-groves and gardens, is level except for occasional small hillocks rising to 300 feet or more. It is crossed by numerous watercourses, most of which are nearly always dry: wells have been constructed in their beds to supply the town and gardens with water. Several of the watercourses around Kalaa Kebira unite to form the Oued el Kebir. About 10 miles west of the town is the Sebkhah Kelbia. The market is held on Fridays, when there is a considerable trade in oil, wool, and cereals.

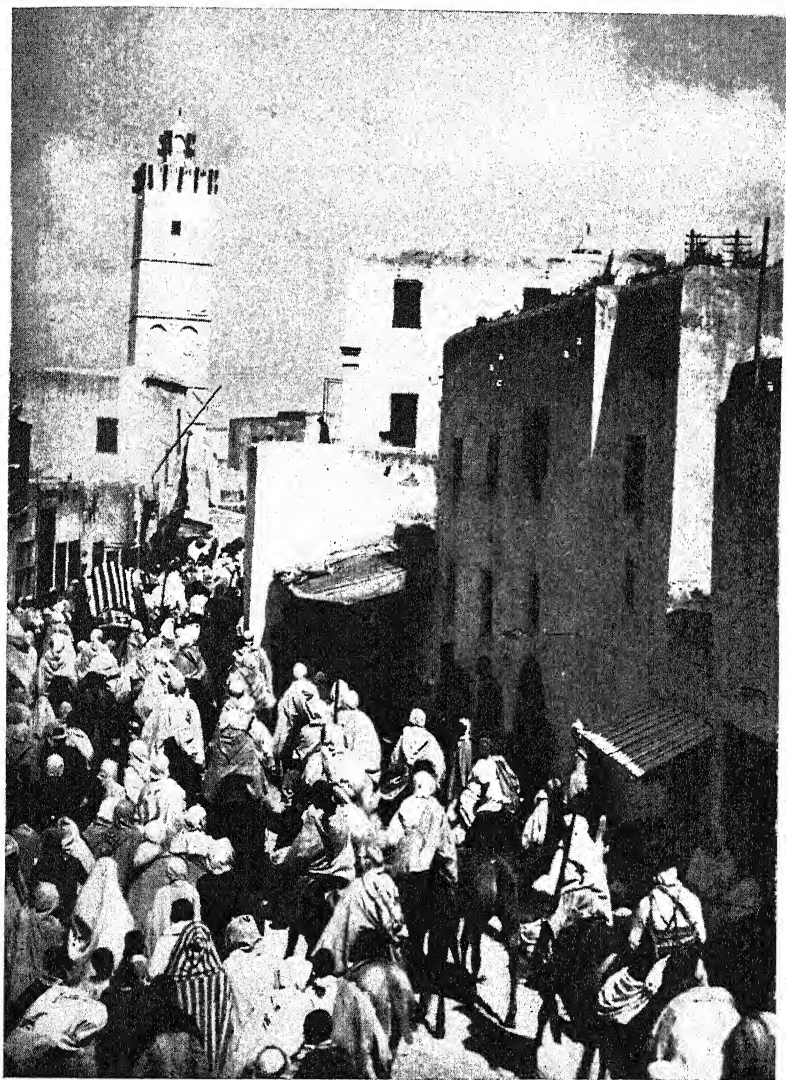
Communications

Rail: Kalaa Kebira is on the narrow-gauge line from Tunis to Sousse, Sfax, and Gabès. The station is about half a mile east of the town.

Road: A branch road 3 miles long connects Kalaa Kebira with the coast road from Tunis and Enfidaville to Sousse, and there are numerous minor roads radiating from the town.

KEBILI. Population: no figures available. Altitude 98 feet. Military post. Infirmary. Meteorological station. Hotels (3). Garages (2).

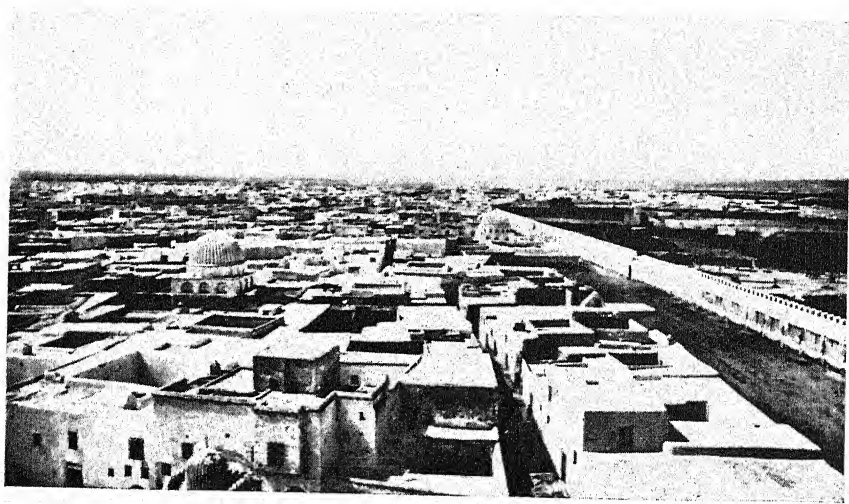
Kebili is 66 miles west-south-west of Gabès and 35 miles south-south-east of Gafsa. It stands on a peninsula jutting out into the Chott Kebili on the eastern edge of the Chott Djerid, and is surrounded by an extensive oasis. Djebel Tebaga rises steeply to over



128. *Kairouan: religious procession*



129. Kairouan



130. Kairouan from the tower of the Great Mosque

1,400 feet about $4\frac{1}{2}$ miles to the north. The southern shore of the Chott el Fedjadj is 6 miles north of the oasis. To the south lies a great undulating steppe with stretches of sand-dunes and occasional oases such as Djemna and Douz (Photos. 38, 80, 181). About $3\frac{1}{2}$ miles north-west of Kebili is Telmine, one of the largest of the forty oases of the district; it is watered by a recently bored artesian well yielding 880 gallons a minute. It stands on the site of the ancient Turris Tamalleni, which was made a colony under Hadrian.

Kebili is inhabited mainly by sedentary tribes, though a considerable number of nomads from the south spend part of the year in the settlement. Sheep and camels are reared in the district, which has a considerable woollen industry. Dates are the principal product of the oasis: 80,000 of the 500,000 date-palms in the oases are in the Kebili oasis. Steps have to be taken against the encroachment of sand on the cultivated area (Photo. 40). A market is held on Mondays at the small village of Souk el Biaz, $1\frac{1}{2}$ miles north-west of Kebili.

Communications

Road: Kebili is at the junction of roads and tracks from Gabès, Gafsa (across the Chott el Fedjadj), Matmata, Douz, and Sabria. A summer track, the Trik el Oudiania, leads north-west across the Chott Djerid to el Oudiane and Tozeur.

KEF, LE (Photos. 133, 134). Population 8,855 (1,357 Europeans). Altitude 2,559 feet. Chief town of a region, a civil control, and a caïdat. Brigade de gendarmerie. Electricity (3-phase, 110/190). Infirmary-dispensary. Meteorological station. Hotels (2). Garages (4).

Le Kef lies 22 miles south of Souk el Arba and 42 miles east of Souk Ahras in Algeria, in the mountains between the valleys of the Oueds Mellègue and Tessa, two of the main tributaries of the Medjerda. The town is built in the shape of an amphitheatre at the south-western end of Dir el Kef, which reaches a height of 3,445 feet about 5 miles to the north-east. To the south of the town is the level expanse of the plateau of Araguib Kamra. The level of the town varies considerably, ranging from less than 2,300 feet at the south-western end to more than 2,750 feet in the north-east.

The old town is enclosed by a crumbling wall, the southern portion of which has been completely destroyed. Much of the enclosed area is uninhabited: stones, capitals, and columns belonging to ancient buildings are strewn everywhere, houses are often in ruins, and the

narrow and irregular streets are badly paved. In the western part of the old town are the remains of Roman baths and of several mosques, one of which may have been built on the ruins of an early Christian basilica. Steep lanes and stepped passages lead up to the Turkish Kasba, now a barracks, built in 1679 on a spur with blocks of ancient Roman buildings. North of the Kasba are several Roman cisterns which are still used.

The European quarter is at the southern end of the native quarter where the wall has been destroyed. It overlooks the olive-groves and gardens which stretch for $1\frac{1}{2}$ miles towards the station, and its houses have red-tiled roofs. An abundant spring, which has supplied the town with water for many centuries, gushes forth below this quarter. The most interesting of the remains is the basilica of Dar el Kous, dedicated to St. Peter, the narthex (vestibule) of which is still used as a church. Olives and cereals, the chief products of the fertile neighbourhood, are brought to the market, which is held on Thursdays.

Le Kef ('the rock') was founded by the Phoenicians, who banished discontented mercenaries to the town after the first Punic war. It was made a colony by Augustus, and to its name Sicca was added the cognomen Veneria from its temple of Venus. It stood at the junction of roads from Theveste (Tébessa), Thagaste (Souk Ahras), Thacia (Bordj Messaoudi) and Simitthu (Chemtou), and was of great strategic importance in the latter years of the Roman Empire. It was the scene of fierce battles between the beys of Tunisia and Algeria in 1694, 1705, and 1807. It was occupied by the French in 1881.

Communications

Rail: Le Kef is the terminus of a narrow-gauge line to les Salines, a junction on the narrow-gauge line from Tunis to Tébessa in Algeria. The station is $1\frac{1}{2}$ miles south of the town.

Road: As in the past, the town is an important road-centre. The main road from Souk Ahras in Algeria to Medjez el Bab and Tunis passes through the town, where it is crossed by the north-south road from Tabarka to Sbeitla.

Ksour ESSAF. Population 9,993 (28 Europeans). Altitude 49 feet. Electricity (3-phase, 220/380). Dispensary. Garage.

Ksour Essaf lies $7\frac{1}{2}$ miles south-west of the port of Mahdia and $2\frac{1}{2}$ miles inland, and is one of the large native towns common in the Sahel of Sousse. To the south-west, south, and south-east small hills

rise to about 220 feet, but otherwise the countryside is level and covered with gardens and olive-groves. North-west and north-east of the town are clusters of wells which supply the town and its gardens. Ras Salakta, the site of the ancient town and port of Sullecthum, is $3\frac{1}{2}$ miles to the south-east: remains of its jetty and fortress are still visible. The market is held on Fridays.

Communications

Road: Ksour Essaf is on the coast road from Tunis and Sousse to Sfax and Gabès, and another road leads south-west to el Djem.

LA GOULETTE, *see* p. 244.

LA MARSA, *see* Marsa, la (p. 218).

LE KEF, *see* Kef, le (p. 215).

MAHDIA (MAHEDIA), *see* p. 262.

MAKTAR. Population 731 (61 Europeans). Altitude 3,074 feet. Chief town of a civil control and a caïdat. Infirmary-dispensary. Meteorological station. Hotels (2).

Maktar is 36 miles south-east of le Kef and 50 miles north-west of Kairouan. It stands on the northern edge of a plateau overlooking the valley of the Oued Saboun. The plateau is bounded on the southern side by the Oued el Ousafa, which joins the Oued Saboun $3\frac{1}{2}$ miles east of the town: the two streams form part of the headwaters of the Oued Siliana. Maktar is surrounded by hills and flat-topped plateaux deeply incised by many watercourses. The surrounding country is treeless except for the Aleppo pine and holm-oak forest of Kesra, where wild pig still abound, about 11 miles to the south-east. The modern town is surrounded by orchards. The district was probably fairly densely populated in ancient times, and there are numerous remains. The principal ruins include the baths in the south-east of the town, a triumphal arch to Trajan (A.D. 116) in the east, another in the north, and the remains of a Christian church, a small amphitheatre, an aqueduct, and temples to Apollo and Diana in the west. On the outskirts are several pre-Roman mausoleums and numerous megalithic monuments. A market is held on Saturdays.

Maktar was for a considerable time a large Phoenician centre: there are several Carthaginian inscriptions. It became a Roman colony in the second half of the second century A.D.

Communications

Road: There are main roads north-west to le Kef and south-east to Kairouan, and tracks lead south-west to Sbiba and north-east to Pont du Fahs.

MARSA, LA (Photo. 60). Population 5,669 (884 Europeans). Altitude 66 feet. Electricity (3-phase, 115/200). Dispensary. Hotel. Garage.

La Marsa, a sea-side resort on the coast between Cap Kamart and Cap Carthage, is 10 miles north-east of Tunis and is often regarded as one of the suburbs of the city. Djebel el Kraoui rises to a height of 341 feet about $1\frac{1}{2}$ miles to the north-west, and to the west a fertile plain cultivated with vines and olives stretches along the shores of the Sebket er Riana towards Ariana. Just over 1 mile to the south-east on the rocky Cap Carthage is the native village of Sidi bou Said (Photo. 59), immediately to the south of which are the ruins of the ancient city of Carthage (Photo. 61).

La Marsa has an extensive beach and many villas and country houses belonging to high officials and wealthy residents of Tunis. Among them is the summer palace of the Resident-General, the Beylical palace, the Archbishop's palace, and the residence of the British Consul-General. There are numerous ancient burial caverns in Djebel el Kraoui and Djebel er Remel on Cap Kamart. During Roman times it was the necropolis of Carthaginian Jews.

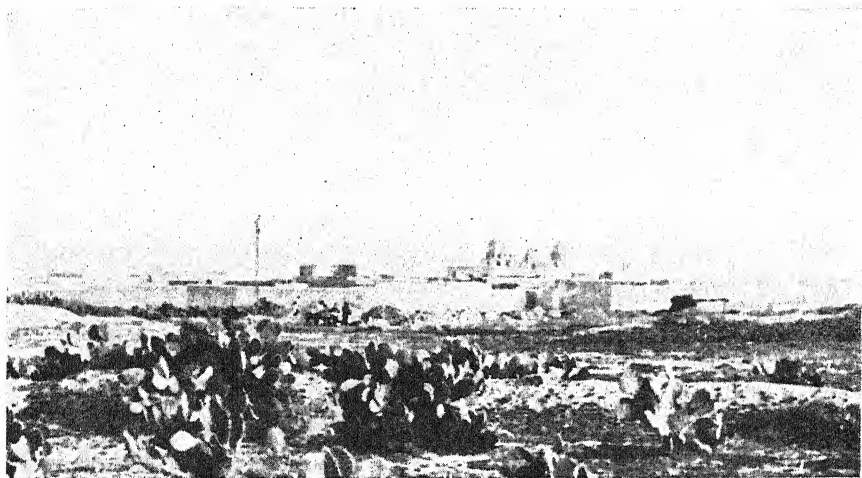
Communications

Rail: La Marsa is connected with Tunis and la Goulette by electric tramways.

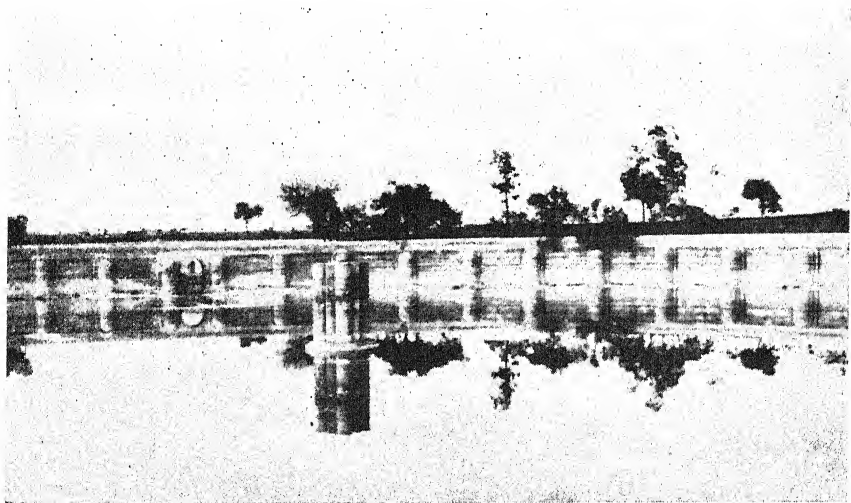
Road: Second-class roads lead south-west to Tunis and south to la Goulette.

MATEUR. Population 7,416 (1,624 Europeans). Altitude 49 feet. Chief town of a caidat. Electricity (3-phase, 115/200). Infirmary-dispensary. Hotels (2). Garages (5).

Mateur is 20 miles south-west of Bizerta and 32 miles north-west of Tunis. It lies on the southern slopes of a small hill, 223 feet high, which rises in the centre of a great plain extending southward from



131. *Kairouan: the town wall and the Mosque of the Swords*



132. *Kairouan: the Bir el Bey reservoir*



133. *Le Kef*



134. *Le Kef*

the Garaet Achkel. The town is on the left bank of the Oued Djoumine, nearly opposite its confluence with the Oued ech Chair, which enters from the east; opposite Mateur the marshy Oued el Kloufi comes in from the south. North of Mateur the plain, broken only by the small hill of Ras el Ain (48 ft.), stretches to the scrub-covered ridge of Djebel Ackhel (1,677 ft.), noted for its marble, and the shores of the Garaet Achkel, the ancient Sisara Lacus (Photos. 8, 10). To the south and east there are low hills, but to the west and south-west the wooded or brushwood-covered slopes of the Mogods rise fairly steeply.

Mateur is still enclosed by its old walls, which were partly built out of the ruins of the Roman Oppidum Matarense. In recent years the town has spread south-westward into the suburb of Sidi Abdallah. Markets are held on Fridays, Saturdays, and Sundays for the tobacco and cereals of the district and the cattle of the Mogods. Canvas and sacks are manufactured. The water-supply comes from springs.

Communications

Rail: Mateur is at the junction of the normal-gauge lines from Tunis, Bizerta, Tabarka, and Béja. The station is about 1 mile east of the town on the opposite bank of the Oued Djoumine.

Road: Roads lead west to Tabarka and la Calle, north to Bizerta, south-east to Djedeida and Tunis, and south-west to Béja.

MÉDENINE (Photo. 104). Population 1,000 (134 Europeans). Altitude 340 feet. Chief town of the Territoires militaires du Sud and a caïdat. Bureau des Affaires indigènes. Infirmary-dispensary. Meteorological station. Hotels (2).

Médenine is 45 miles south-east of Gabès and about 35 miles west of Zarzis. It stands on the Oued Médenine, which flows as the Oued Smar north-east towards the Golfe de bou Grara, in the centre of a stony, featureless plain which is incised by numerous oueds. Occasional palm-groves are grouped around the wells in the beds of these watercourses. About 14 miles to the south-west the Monts des Ksour rise to more than 650 feet. The Berber village of Metameur is about $3\frac{1}{2}$ miles to the north-west; its ksar and ghorfas (p. 155) are very similar to those of Médenine (Photo. 135).

The French village of Médenine, containing all the military and administrative buildings, is on the southern bank of the Oued Médenine, with the military camp on a small hill, 371 feet high, to the south. The ksar is about 500 yards north of the French village on the opposite side of the oued. Its centre is a large square surrounded

by the Kasba, arcades, and ghorfas, which are used partly as the dwellings but mainly as the storehouses of the local tribes. During the last twenty years many of the ancient buildings have been destroyed or hidden by the growth of a native quarter on the slopes below the ksar, and of a souk and a commercial centre on the slopes above. Médenine is the capital of the Ouerghemma, a league of the Berber tribes of Touazine, Ouderna, and Accara.

Communications

Road: Roads lead north to Gabès, north-east to Bou Grara, south-east to Ben Gardane (with a branch to Zarzis), and south to Fom Tatahouine. There are also tracks to Matmata and el Hamma through Metameur and to Kebili.

MEDJEZ EL BAB. Population 3,400 (571 Europeans). Altitude 197 feet. Chief town of a civil control and a caïdat. Infirmary-dispensary. Hotels (2). Garages (4).

Medjez el Bab is on the right bank of the Oued Medjerda about 20 miles before it reaches the plain of Tunis, and 34 miles south-west of Tunis. On the opposite side of the river a chain of mountains trends south-westward from Tebourba towards the town, reaching 1,847 feet in Djebel Lanserine and 2,192 feet in Djebel Heidous. On the right bank there are some much lower hills, which are 741 feet high in Djebel bou Aoukaz to the north-east of Medjez el Bab. The fertile plain of Goubellat, where cereals are grown and livestock raised, is 8 miles south of these hills.

Medjez el Bab stands on the site of the Roman city of Membressa, of which there are few remains: these include the ruins of the bridge that formerly spanned the river. The present town was founded by Andalusian immigrants: the seven-arched bridge to which the town owes its name (the 'ford by the gate') was built of Roman materials in 1677 (Photo. 197). There are numerous remains of Roman cisterns, triumphal arches, baths, and mausolea in the district, notably at Chaouach (anc. Sua), 5 miles to the north-west, and Toukabeur (anc. Thuccabor), $1\frac{1}{2}$ miles farther north-west. The market, held on Mondays, deals mainly with cereals.

Communications

Rail: The normal-gauge line from Tunis to Ghardimaou passes through Medjez el Bab. The station is on the left bank of the Medjerda, $1\frac{1}{2}$ miles north-east of the town.

Road: Medjez el Bab is at the junction of the road from Souk Ahras and Teboursouk to Tunis and of the Béja-Oued Zarga-Goubellat-Bou Arada road. Another road leads north-east to Tebourba.

MENZEL BOU ZELFA. Population 5,318 (22 Europeans). Altitude 154 feet. Electricity (3-phase, 200/380).

Menzel bou Zelfa is an almost entirely native town about 24 miles south-south-east of Tunis in the plain between the north-eastern extremity of the Dorsale and the hills of the Cap Bon peninsula. It is the centre of a region of about 470,000 olive-trees, which nearly surround the town and stretch westward beyond Soliman almost to the shores of the Golfe de Tunis. To the south-east there are extensive vineyards and orchards. To the north-east Djebel Hofra (1,381 ft.), one of the first ridges of Djebel Sidi Abd er Rahman, rises fairly steeply from the plain. The district is famed for its cattle, and a large cattle market is held every Thursday. There are many olive-oil presses in the town, and oranges are grown. There is a zaouia of the Kadriya brotherhood in the town.

Communications

Rail: Menzel bou Zelfa is on the narrow-gauge line from Menzel Heurr in the Cap Bon peninsula to the Tunis-Sfax-Gabès line at Fondouk Djedid. The station is three-quarters of a mile south of the town.

Road: The road from Tunis to Menzel Temime and Kelibia passes through the town, which also has roads leading north-east along the west coast of the Cap Bon peninsula to Tozebrane, and south-west to Grombalia.

MENZEL TEMIME. Population 8,532 (57 Europeans). Altitude 56 feet. Infirmary-dispensary. Hotel.

Menzel Temime is 7 miles south-west of Kelibia on the eastern side of the Cap Bon peninsula, and about $1\frac{1}{2}$ miles inland. Just over 2 miles to the north-west, beyond the village of Skalba, are two salt-lakes, the Sebkha Fardjouna and the Sebkret Serira, beyond which the eastern slopes of Djebel Sidi Abd er Rahman rise gradually to heights of over 650 feet. South of Menzel Temime the shore is backed by narrow salt-marshes, behind which is a low wooded ridge, 90 to 130 feet high. The town is surrounded by gardens and olive-groves, which are watered by wells along the beds of watercourses. A market is held on Tuesdays.

Communications

Road: The main road from Tunis and Nabeul to Kelibia passes through the town, and another road leads south-west to Menzel bou Zelfa and Tunis.

MOKNINE. Population 14,205 (77 Europeans). Altitude 85 feet. Electricity (3-phase, 220/380). Hotels (2).

Moknine is 20 miles south-east of Sousse and nearly 3 miles inland from the coast between Ksiba el Mediouni and Ras Dimasse. It stands at the north-western edge of the Sebkha Mta Moknine which extends southward for $5\frac{1}{2}$ miles at a distance of about $2\frac{1}{2}$ miles from the coast. The town, which is surrounded by olive-groves, stands north of the Oued Krecili which flows into the Sebkha Mta Moknine. The population includes about 750 Jews, many of whom are goldsmiths making jewellery in the ancient Byzantine style similar to that of Djerba. Pottery and soap are also made, and oil is one of the principal products sold in the market, held on Wednesdays. The ruins of Leptis Minor are nearly 4 miles north-west of Moknine; those of Thapsus, where Julius Caesar decisively defeated King Juba, a partisan of Pompey, in 46 B.C., are $7\frac{1}{2}$ miles to the east near Ras Dimasse.

Communications

Rail: Moknine is served by the Msaken-Mahdia branch of the narrow-gauge line from Tunis and Sousse to Sfax and Gabès. The station is about half a mile west of the town.

Road: The coast road from Sousse to Sfax passes through Moknine, and another road leads west to the Sousse-el Djem-Sfax road.

MONASTIR, *see* p. 260.

MSAKEN. Population 20,088 (43 Europeans). Altitude 190 feet. Dispensary.

Msaken is the largest of the settlements in the Sahel of Sousse inhabited almost wholly by natives. It is $7\frac{1}{2}$ miles south-west of Sousse and nearly 7 miles from the coast. It lies on the left bank of the Oued el Melah, which is dry for most of the year: this oued enters the sea as the Oued Hamdoun. The surrounding country is flat and monotonous, and was at one time poorly cultivated, but now there are rich olive-groves, gardens, and fields of cereals. The ruins of Knissa are 4 miles to the north-east, and at Moureddine, $2\frac{1}{2}$ miles north-west,

there is an Aghlabite reservoir. Msaken has many oil-presses, eighty of which are modern; a market is held on Mondays, at which olives, olive-oil, and cereals are the chief products.

Communications

Rail: Msaken is on the narrow-gauge line from Tunis and Sousse to Sfax and Gabès and is the junction for the branch-line to Mahdia. The station is half a mile east of the town.

Road: The direct road from Sousse to Sfax passes through Msaken, from which another road branches west to Kairouan and Maktar.

NABEUL. Population 9,107 (618 Europeans). Altitude 32 feet. Chief town of a caïdat. Electricity (3-phase, 220/280). Infirmary-dispensary. Hotels (2). Garages (2).

Nabeul is about 1 mile from the sea on the coastal plain on the southern side of the Cap Bon peninsula, and 38 miles south-east of Tunis. It has a very mild and equable climate and, like Hammamet, 8 miles to the south-west, is a popular winter resort. The town is surrounded by extensive gardens. To the north the land rises gently at first, and then more steeply to 375 feet in Djebel el Djerraia, above which numerous brushwood-covered peaks reach heights of about 875 feet: to the west Djebel Reba el Ain, a steep-sided hill behind Hammamet, rises to 1,076 feet. The coast between Nabeul and Hammamet is crossed by numerous oueds, which are usually dry. To the north-east of the town there are several villages among the gardens, orchards, and olive- and orange-groves shaded by cypresses. Near Dar Chabane, less than 1 mile north-east, there are some quarries used by local craftsmen in the construction and decoration of the houses of the district. The local potters obtain their special earth from Ras Tefal, $2\frac{1}{2}$ miles north-west of the town.

Nabeul is an attractive town with several mosques and busy souks. Its chief industry is the distillation of perfume, especially rose, orange, and geranium. There are also some potteries producing faience with geometrical patterns of Carthaginian and late Roman style, and porous, unglazed water-jugs (*gargoulettes*). Other workshops produce embroidery, lace, and table-linen. The market is held on Fridays. Water is obtained from springs. Two submarine cables come ashore at Nabeul, one from Beirut in Syria and the other from Jgalo in Yugoslavia.

The ancient town of Neapolis is 1 mile south-west of Nabeul on the shore. It was taken by Agathocles in 310 B.C., and destroyed by

the Romans at the same time as Carthage (146 B.C.). The modern name of the town is derived from it, and much of the building material came from the ruins, which are now scattered and partly submerged.

Communications

Rail: Nabeul is the terminus of a branch line which passes through Hammamet to join the main line from Tunis to Sousse, Sfax, and Gabès at Bir bou Rekba.

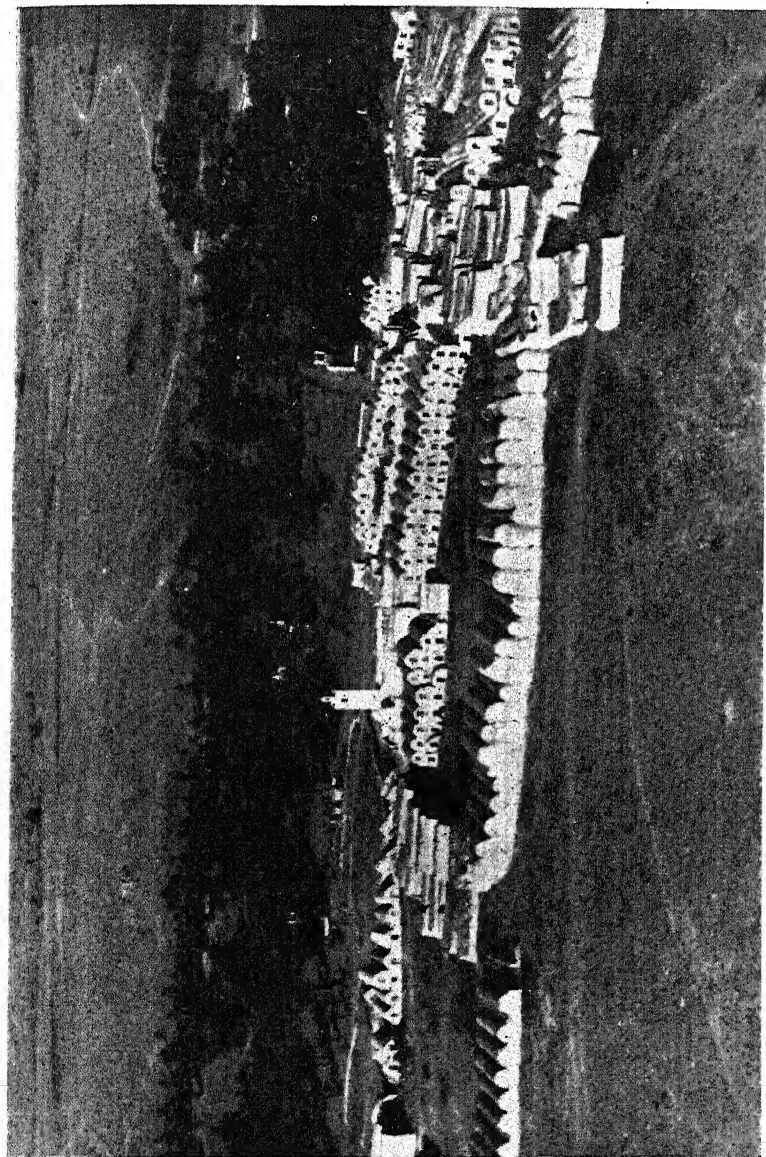
Road: The main road from Hammamet to Kelibia passes through Nabeul, and another road leads north-west to Grombalia and thence to Tunis.

NEFTA (Photos. 114, 136, 137). Population 13,619 (29 Europeans). Altitude 299 feet. Hotel.

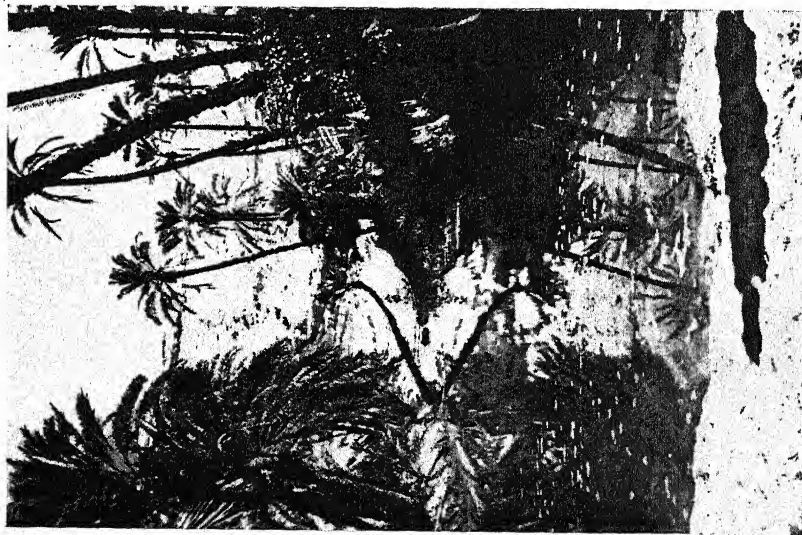
Nefta is almost at the western end of the Chott Djerid, only 20 miles east of the Algerian boundary and 63 miles south-west of Gafsa. The town, which is on the site of the Roman Aggarsel Nepte, is made up of several villages or quarters. It lies on the slopes above a ravine alined from north to south, in which numerous springs gush out. Sand-dunes stretch west and south-west across the Algerian border towards the Souf oases, and north and north-west for nearly 10 miles to the Chott el Rharsa. To the east, towards Tozeur, the country rises to about 600 feet.

Most of the houses in Nefta have one story and, like those in Tozeur, are built of crude toub and burned brick with a peculiar geometrical pattern in the brickwork (Photo. 107). Blocks of gypsum quarried locally have also been used. Nefta is an important religious centre with numerous mosques and zaouias, notably the mosque of Sidi Salem and the zaouia of the Kadriya, a religious brotherhood of the Rahman order. Saharan caravans visit the souks in which white fer-rachias (blankets), burnous, and silk haiks are sold. The ordinary market is held daily with a cereal and cattle market on Sundays.

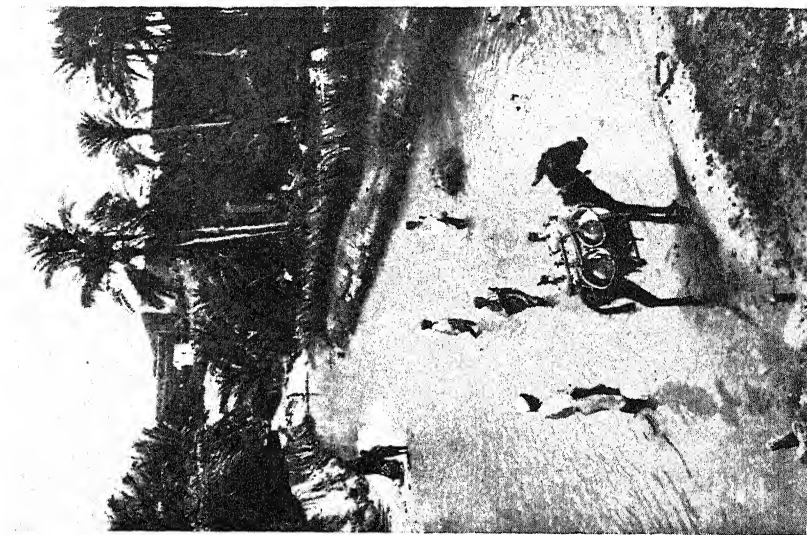
The Nefta oasis, one of the oases of the Djerid, the largest of which is Tozeur (p. 228), occupies 1,750 acres mostly south of the town towards the Chott Djerid, and is bordered by marshland. It is irrigated by more than 150 springs which yield 110 gallons a second and rise in the gorge at the northern end of the town: first of all they form two brooks and then unite into a large stream. The gorge, which is carpeted with luxuriant palm-groves, above which are steep and bare slopes, is known as the Kasr el Ain or the 'corbeille de Nefta'. There are at least 240,000 date-palms in the oasis, with



135. *Metameur near Médénine: ghorfas*



136. Nefta: Kasr el Ain



137. Nefta

olives and fruit-trees, including pomegranate, fig, apricot, and peach, beneath their shade.

Communications

Road: Desert tracks lead south-west to el Oued and Touggourt in the Algerian Sahara and east to Tozeur.

PEYROUTON, *see* Grombalia (p. 210).

QABES (GABÈS), *see* p. 272.

SFAX, *see* p. 266.

SOUK EL ARBA. Population 4,011 (755 Europeans). Altitude 469 feet.

Chief town of a civil control and a caïdat. Brigade de gendarmerie.

Electricity (3-phase, 110/190). Infirmary-dispensary. Meteorological station. Hotel. Garage.

Souk el Arba is 22 miles north of le Kef and about 10 miles east of the Algerian boundary. It stands on the right bank of the Oued Medjerda $4\frac{1}{2}$ miles above its confluence with the Oued Mellègue, and at the western end of the fertile Dakhla or Ouled bou Salem plain, one of the principal cereal-producing areas of Tunisia since ancient times. About 7 miles to the south the Oued Mellègue breaks through a series of scrub- and forest-covered ridges, which are between 1,150 and 1,350 feet high, and trend from south-west to north-east. Djebel el Hairech, an isolated hill, reaches 2,264 feet about $5\frac{1}{2}$ miles to the west of the town. To the north the southern slopes of the Monts de la Medjerda rise fairly rapidly.

The town is a leading market and commercial centre, but otherwise is without interest. Markets are held on Wednesdays (whence its name—Arabic *arba*, 'four' or 'Wednesday') and on Fridays, and there is a considerable trade in cereals, skins, and wool. Many of the inhabitants are immigrant farmers.

The ruins of the important Numidian city of Bulla Regia, or Hammam Derradji, are 5 miles north-north-west of Souk el Arba, on a plateau dominated by Djebel Rebia. In the centre of the ruins there is a spring of water which supplies Souk el Arba by an aqueduct. The city was very prosperous in Roman times, but was destroyed by an earthquake, and its remains are partly buried. The principal ruins include a theatre, baths, nymphaeum, cisterns, amphitheatre, Byzantine fortress, temple, and several Roman dwelling-houses with beautiful mosaics.

Communications

Rail: The normal-gauge line from Tunis to Souk Ahras passes through Souk el Arba. About $6\frac{1}{2}$ miles south of the town is the station of Muthul on the mineral branch-line from Nebeur to the main line at Sidi Smail.

Road: Souk el Arba is at the junction of the main roads from Souk Ahras to Tunis and from Tabarka to le Kef.

SOUSSE (SUSA), *see* p. 255.

TABARKA (TABARCA), *see* p. 233.

TEBOURSOUK. Population 4,500 (300 Europeans). Altitude 1,312 feet.

Chief town of a civil control and a caïdat. Brigade de gendarmerie.

Electricity (3-phase, 110/190). Infirmary-dispensary. Hotels (4).

Garages (2).

Teboursouk is 40 miles east of Souk el Arba and 55 miles south-west of Tunis. It stands on high ground on the southern bank of the Oued Souani, which, 2 miles east of the town, joins the Oued Kralled, a tributary of the Oued Siliana. The town is surrounded by olive-groves and has been built in the shape of an amphitheatre between two small hills, one to the north rising to 1,385 feet and the other to the south to 1,732 feet. South-eastward across the valley the brushwood-covered slopes of Djebel ech Cheid reach 2,507 feet, and to the north-west Djebel Goraa rises to 3,159 feet in Kef Goraa.

The town is enclosed by a defensive wall, built by the Byzantines, with square towers at intervals. With the exception of the main street, which is fairly well paved and maintained, it has a dirty appearance. Many fragments of the ancient town have been built into the walls of the narrow streets. The European part of the town is below the native quarter, at the entrance to Teboursouk from Tunis. In the north-eastern angle of the town there is a pentagonal-shaped Byzantine citadel. The market, to which oil, cereals, and livestock are brought, is held on Thursdays.

Teboursouk is the ancient Thubursicum. Nearly 3 miles to the south-west are the extensive remains of Dougga, the ancient Thugga, on a hill 1,873 feet high overlooking the Kralled valley (Photos. 23, 82, 86, 88, 176). Dougga was important in Carthaginian times and was taken by the Numidian King Massinissa in the second century B.C. The height of its prosperity did not come until the reign

of Septimus Severus at the end of the second century A.D., soon after which it was made a colony. Its ruins, which are among the most notable in north Africa, belong to this period, and include the theatre, forum, triumphal arch, capitol, temples, mausoleum, circus, and aqueduct.

Communications

Road: The main road from le Kef to Tunis passes through Tebour-souk, and other roads lead north-west to Souk el Arba and west to Souk el Djemaa.

THALA. Population 1,758 (168 Europeans). Altitude 3,038 feet.

Chief town of a civil control and a caïdat. Infirmary-dispensary. Meteorological station. Hotel. Garage.

Thala is 45 miles south of le Kef and 17 miles east of the boundary of Algeria, near the head of a valley between two hills: that to the north-west is 3,192 feet high, and that to the east, which is covered with trees, is 3,255 feet. Opposite Thala a spring gives the first perennial water to the Oued Mach Allah, which flows northward to the Oued Haidra. South of the town Djebel ech Char reaches a height of 3,987 feet in Kef ech Chaga, and on the east the wooded peaks of Djebel el Krarbougui rise to over 3,445 feet. To the west and north-west the country falls gradually towards the valley of the Haidra, apart from a line of hills 2,600 to 2,775 feet high running north-west towards Kalaa Djerda.

The district around Thala is very fertile and watered by abundant springs, many of which were used by the Romans. The market, which is mainly for cattle and horses, is held on Fridays and Sundays and visited by the Arabized Berber tribes of Fraïchiche and Madjeur. In the neighbourhood there are lead mines at Sidi Mabrouk, Ain Nouba, Djebel Ladjéred, Kef Chambi, and elsewhere.

Thala dates from Roman times, but although it then had its present name, there is nothing to indicate that it was the Thala mentioned by Sallust in the Jugurthine wars. The town was most prosperous under Diocletian. There are numerous Roman remains, but none of them is particularly interesting.

Communications

Road: Thala is at the centre of roads leading north-west to Kalaa Djerda, north-east to Ebba Ksour, east to Sbiba, south to Kasserine, and west to Haidra.

TOZEUR (Photos. 45, 115). Population 11,698 (112 Europeans). Altitude 203 feet. Chief town of a civil control and a caïdat. Brigade de gendarmerie. Infirmary-dispensary. Meteorological station. Hotels (3). Garage.

Tozeur is on the northern shores of the Chott Djerid about 50 miles south-west of Gafsa and 14 miles east of Nefta. It is the capital of the Djerid, which consists of the oases of Tozeur, Nefta, el Oudiane, and el Hamma. To the west, along the shore of the chott towards Nefta, a low hill rises to about 600 feet, behind which sand-dunes stretch north-westward to the Chott Medjez Sfa, the easterly continuation of the Chott el Rharsa. About 12 miles north-east of Tozeur there is a line of fairly steep-sided ridges, including Djebels Sidi bou Helal (863 ft.), Drhoumess (1,214 ft.), and Krerfane (1,260 ft.).

The Tozeur oasis has an area of about 2,500 acres, which are irrigated by nearly 200 springs yielding 165 gallons a second. From their source in Ras el Ain a network of canals radiates through the oasis. The town stands on the site of the ancient Thusuros and is entirely native in character. The houses are mostly of one story, and are built of crude toub and burned bricks with a peculiar geometrical brickwork ornamentation (Photo. 107). Around a large square in the centre of the town are many modern houses built in this ancient style. Most of the numerous mosques have square lanterns in their minarets. The oldest, in the adjoining village of Bled el Hader, was founded in 1027: its mihrab, or sacred niche facing the direction of Mecca, dates from the thirteenth century and has fine stucco ornamentation. Several nearby villages form the suburbs of Tozeur, and include Chabia on the west, Zaouiat Sahraoui, Djehim, and Abbès on the south-west, and Bled el Hader on the south. A market, at which there is considerable trade in wool, cloth, silk, skins, and dates, is held daily, but the souks are not as busy as those at Nefta.

Communications

Rail: Tozeur is the terminus of the narrow-gauge line from Met-laoui, the junction for the lines to Sfax through Gafsa and to Sousse through Fériana.

Road: Roads and tracks lead west to Nefta and on to el Oued and Touggourt in Algeria, north-west to Tamerza on the Algerian boundary and beyond to Négrine or Tébessa, and north-east to Philippe-Thomas and Gafsa. There is also a track along the shore of the Chott

Djerid to Kriz, whence a summer track, the Trik el Oudiania, leads south-east across the chott to Kebili.

TUNIS, *see* p. 249.

ZAGHOUAN. Population 3,727 (474 Europeans). Altitude 820 feet.

Chief town of a civil control and a caïdat. Brigade de gendarmerie.

Infirmiry-dispensary. Hotel. Garages (3).

Zaghouan stands on the northern slopes of Djebel Zaghouan, 28 miles south of Tunis and 24 miles west of Hammamet. The town is on a spur, separated by a small valley from the main mountain mass, which rises to a height of 4,249 feet in Ras el Gassaa nearly 4 miles to the south-east. The slopes around and below Zaghouan are watered by abundant springs and are covered with orchards, gardens, and olive- and orange-groves. To the north of the town is the valley of the Oued es Smar, a tributary of the Oued Miliane, beyond which the scrub-covered slopes of Djebel er Rebaia rise fairly steeply. Towards Pont du Fahs the Oued es Smar valley widens into the plain of Depienne (Smindja): east of Zaghouan are several small hills. Many of the inhabitants are employed in the making and dyeing of chechias, almost a monopoly of Zaghouan, and in the manufacture of mats and charcoal. A market is held on Fridays.

Zaghouan probably occupies the site of the ancient Onellana, but this is not certain: all the Roman remains are covered by modern buildings, except for the triumphal arch which forms the principal entrance to the town. About $1\frac{1}{2}$ miles south-west are the remains of a temple in a semicircular colonnade (the nymphaeum) built over the famous Ain Ayed spring which supplied Carthage with water and still contributes to the supply of Tunis (p. 255, Photos. 83, 84).

Communications

Rail: Zaghouan is the terminus of a narrow-gauge line from Depienne (Smindja) on the narrow-gauge line from Tunis to Tébessa.

Road: One of the roads from Tunis to Enfidaville passes through Zaghouan, and there are also roads west to Pont du Fahs and east to Hammamet.

ZARZIS, *see* p. 277.

CHAPTER XI

PORTS

ALL the trade of Tunisia with metropolitan France and with foreign countries is carried by sea, except for between 20,000 and 30,000 tons per annum that crosses the land frontier between Tunisia and Algeria, and a negligible amount passing from Tunisia into Libya. Thus the ports play an outstanding part in the economic and commercial life of the country: they are also important because of their position near the narrowest part of the Mediterranean (from Cap Bon to Sicily) and between the western and eastern basins of that sea. Bizerta is, after Toulon, the leading French naval base in the Mediterranean.

Tunisia has two very different coasts, the north from the Algerian boundary to Cap Bon, and the east from Cap Bon to the Libyan boundary: their general characteristics are described on pp. 49-50. The north coast, a continuation of that of Algeria, is generally high and rocky, and though there are good anchorages it has few natural harbours: access inland is difficult because of uplands near the coast. Large ports have developed only at Bizerta and at Tunis with la Goulette, where there are lakes immediately behind the coast, and where communication with the interior is relatively easy by way of the plains of Mateur and Bizerta and the valleys of the Oueds Medjerda and Miliane. The east coast, in contrast, is low and sandy with shallow water off shore, so that harbour construction is difficult and constant dredging essential: access to the interior, on the other hand, is easy across the open country of the Sahel and the Low Steppes. Sfax and Sousse are major ports, and Monastir, Mahdia, and Gabès subsidiary ports, along this coast.

All Tunisian ports with a total trade of 2,000 tons or more in 1937, a fairly normal trade-year, are listed in the table below, and all are described in this chapter except for el Marsa (Marsa Ksiba), Adjim, and Sidi Daoud, which are fishing-centres rather than ports. El Marsa, about 5 miles north of Ben Gardane, is on the southern shore of the Bahiret el Biban, a large lagoon with a very narrow and shallow entrance between Ras Lemsa and the Libyan boundary at Ras Adjir (Fig. 17); its fisheries have been conceded to a French company. Adjim is the largest fishing-port of the Île de Djerba and the terminus of the ferry service across the Adjim channel from Djorf

on the mainland (Fig. 16, Photos. 69, 170). Sidi Daoud is a tunny-fishing centre on the north-western side of the Cap Bon peninsula, near Thonara bay and about 8 miles south-west of Cap Bon (Fig. 15); it is also the landing-point for shipping between the mainland and the two inhabited islands of Zembra and Zembretta.

The Principal Ports of Tunisia, 1937

Port	No. of ships	Tonnage of ships	Imports (tons)	Exports (tons)	Total foreign trade (tons)	No. of passengers
Sfax . .	1,665	930,504	149,652	1,490,225	1,639,877	801
Tunis . .	1,401	1,807,056	416,184	711,288	1,127,472	116,313
La Goulette .	292	500,822	132,445	772,683	905,128	3,332
Sousse . .	587	519,983	46,922	447,581	494,503	162
Bizerta . .	417	712,216	157,285	217,863	375,148	49,295
Monastir . .	44	18,522	455	31,600	32,055	—
Mahdia . .	98	13,547	860	24,276	25,136	54
Gabès . .	309	41,159	16,244	1,945	18,189	—
Houmt Souk	445	112,595	12,311	3,005	15,316	515
Zarzis . .	472	38,002	8,093	1,995	10,088	—
El Marsa (Marsa Ksiba)	363	4,018	6,356	861	7,217	—
Tabarka . .	50	25,268	106	5,627	5,733	—
Adjim . .	270	4,132	1,761	2,226	3,987	—
Sidi Daoud .	108	2,549	1,142	1,077	2,219	426

Altogether 7,011 ships with a total tonnage of 4,735,325 entered the ports of Tunisia during 1937: total exports amounted to 3,714,446 tons and imports to 950,925 tons, and there were 170,978 passengers. Further information about shipping is given on p. 356, and the main shipping routes between Tunisia and other countries before the present war are listed on pp. 412-413.

Fig. 41 illustrates diagrammatically the relative importance of the ports of Tunisia and in particular emphasizes the dominance of the leading five ports, which deal with nearly 96 per cent. of the country's total trade. It also shows the lack of balance between the import and export trade of the various ports, a not uncommon feature of countries which are in a fairly early stage of economic development: this is particularly marked in the case of the mineral-exporting ports of Sfax, la Goulette, and Sousse. Similar disparity is revealed by the figures given in the table above for Monastir and Mahdia, the trade of which consists largely of the export of olive-oil, and for Tabarka, which exports little but cork. Gabès, Houmt Souk on the Île de Djerba, and Zarzis, on the other hand, are ports in southern Tunisia which produces little for export, and are mainly concerned with the import of goods produced elsewhere for the local market.

A striking feature of the ports of Tunisia is that each of the four largest towns in the country is a port. Tunis is the chief town and the second port—the first if its associated port and suburb of la

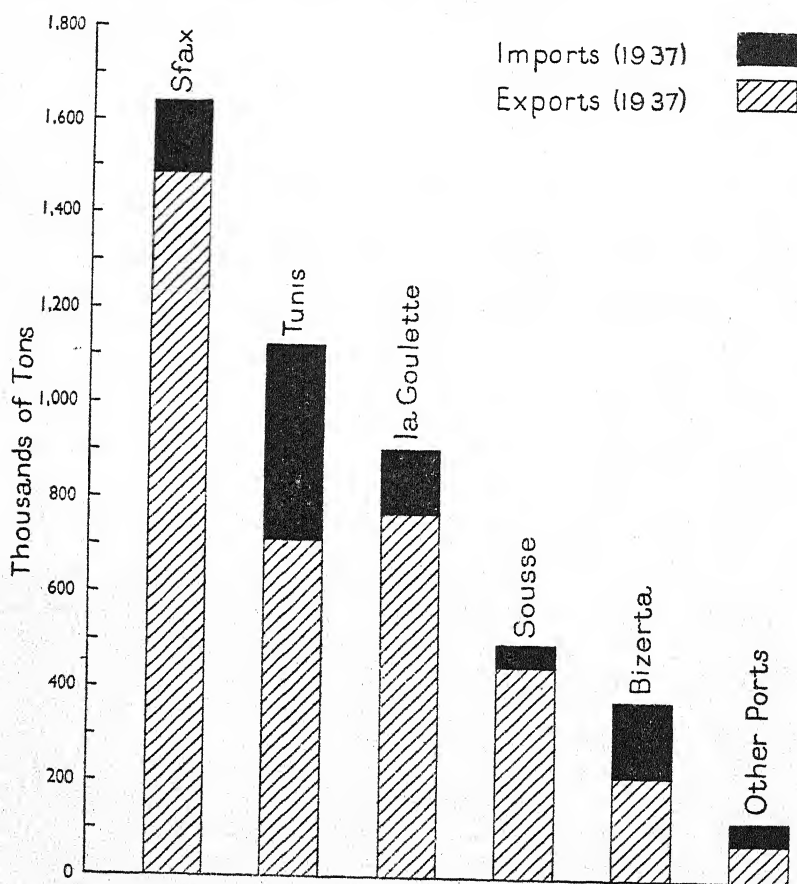


FIG. 41. *The trade of the ports of Tunisia, 1937*

Goulette be included with it. Sfax is the second town and has the largest tonnage of any port; Sousse is the third town and fourth port, and Bizerta the fourth town and fifth port. La Goulette, if taken by itself, as in this chapter, is the fourteenth town in size, but its heavy iron-ore traffic makes it the third port, with an export trade exceeding that of its neighbour Tunis. These five ports are also remarkable for the concentration in them of nearly two-thirds of the total European population of Tunisia, and in 1936 they

were the only urban areas with more than 5,000 Europeans except for Ferryville: the 5,864 Europeans in Ferryville were, moreover, mainly the workers or families of workers in the naval dockyard and arsenal of Sidi Abdallah, which forms a part of the port of Bizerta, under which it is described on pp. 242-243.

The hinterlands of the ports are fairly clearly defined by the nature of the road network and railway lines, which are described in Chapters XV and XVI. Northern Tunisia is served by Bizerta, la Goulette, and Tunis: Tabarka is the outlet of only a small part of the mountainous north-west where communications are difficult and forest products the only exportable commodities. Very little of the traffic passing through the Algerian port of Bône appears to be of Tunisian origin. By their road and rail connexions Tunis and la Goulette extend their hinterland well into central Tunisia, particularly by way of the Tunis-Tébessa railway which passes through the iron-ore and phosphate producing districts of the High Tell. Otherwise central Tunisia is tributary to Sousse and Sfax, Sousse exporting the phosphate of the Ain Moularès district together with the olive-oil and other products of its own Sahel, and Sfax dealing with the heavy mineral traffic of the Metlaoui-Gafsa-Maknassy region (also mainly phosphate) besides local produce (chiefly olive-oil). By comparison the trade of all other ports is insignificant, and the areas served by them small.

Before the present war Bizerta, Tunis, la Goulette, Sousse, and Sfax could supply coal to vessels, and Bizerta, Tunis, and la Goulette maintained fair stocks of oil fuel, but none of these ports ranked as first-class fuelling stations despite the efforts of the French authorities to encourage such developments, notably at Bizerta.

Much of the information given in the heading of each port described in this chapter is based on the directory *Didot-Bottin, Annuaire du Commerce* (Paris, 1939). Details of administration, police, justice, &c., are given in Chapter IX, and further information relating to communications in Chapters XV-XVII. The districts surrounding the ports are described in Chapters II and III and, to facilitate reference to these chapters, the ports are taken in their geographical, not alphabetical, order, from Tabarka in the north-west to Zarzis in the south-east. Their approximate location and size are indicated in Fig. 39.

TABARKA (TABARCA) (Fig. 42; Photos. 57, 138). Lat. $36^{\circ} 58' \text{N.}$, long. $8^{\circ} 46' \text{E.}$ Population *c.* 3,200 (*c.* 720 Europeans). Altitude

98 feet. Chief town of a civil control. Brigade de gendarmerie. Infirmary-dispensary. Meteorological station. Hotels (3). Garages (3).

Tabarka is a small town and port of north-western Tunisia 5 miles east of the Algerian boundary, 20 miles east of the Algerian port of

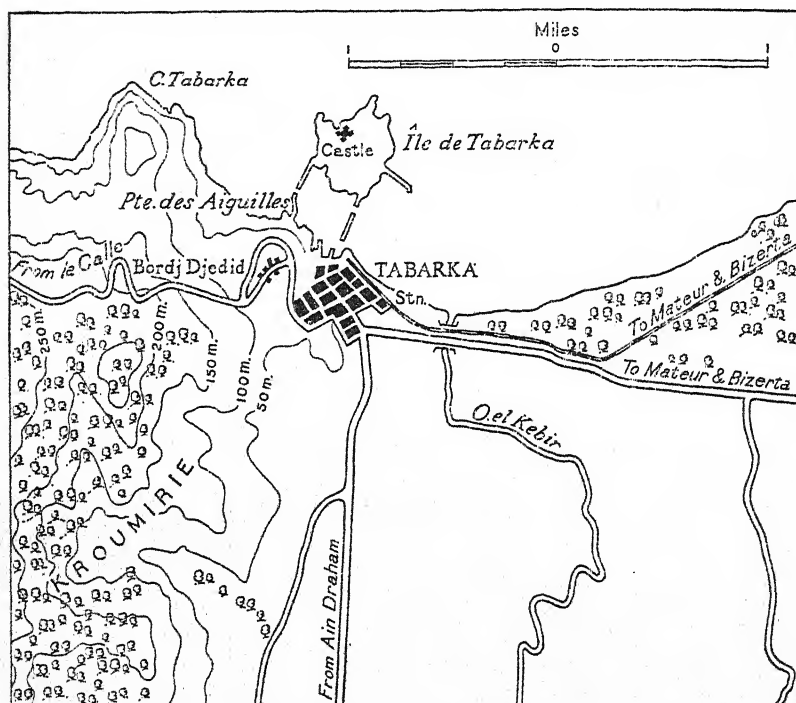


FIG. 42. Tabarka (Tabarca)

la Calle, and 76 and 95 miles west of Bizerta and Tunis respectively. The town is on the western side of the Oued el Kebir estuary, about 1 mile south-east of the rugged Cap Tabarka. The mountains of the Kroumirie rise steeply behind the town and are covered with dense forests of cork oak and Portuguese (zen) oak. About a quarter of a mile off shore is the Île de Tabarka, 600 yards long, 440 yards wide, and 210 feet above sea-level at its highest point. The island, which is connected to the mainland by a shallow bar on which is a rubble breakwater, has steep cliffs on its northern side but slopes gently towards the south (Photo. 57). On its summit are the ruins of an old Genoese castle, now surmounted by a modern lighthouse. The town

is on the southern side of the harbour and has two landing-places. Formerly there were two Turkish forts: one, Bordj Djedid, on high ground to the west, has been restored and is used as a barracks, but the lower fort, Bordj Messaoudi, is in ruins, as are most of the other ancient buildings. A number of early Christian cemeteries have been discovered, and some mosaics from the tombs are in the Musée Alaoui at Tunis (le Bardo).

Anchorage is available both west and east of the island, but neither affords good protection, and the holding ground is bad. The eastern anchorage, also known as the summer anchorage, is the more exposed: the western is somewhat sheltered by the island and is nearer the landing-places, but is dangerous in bad weather.

History

Tabarka was the ancient Thabraca, the port of export for the pink and yellow 'Numidian' marbles quarried at Chemtou (the ancient Simitthu) in the Medjerda valley between Ghardimaou and Souk el Arba, and used in many of the buildings of Imperial Rome. The harbour was in the channel between the mainland and the island, and remains of jetties are still visible. It became a Roman colony during the third century A.D. In the sixteenth century the island was ceded to Charles V in payment of the ransom of the corsair Dragut, captured by Andrea Doria, and in 1540 a concession for coral-fishing was granted to the Lomellini family of Genoa. This concession was held, first from the Spanish and later from the Turks, for over two centuries. A castle was built and a garrison maintained. At the end of the seventeenth century there were 1,000 persons on the island, including a garrison of 200. For many years there was considerable rivalry with the French trading centre established about 15 miles north-east of Tabarka at Cap Nègre, which specialized in the export of wheat from the Béja region. In 1741 the Turks from Tunis took possession of the island, selling the inhabitants as slaves. During the eighteenth and nineteenth centuries the Kroumirie tribes of the hills behind Tabarka frequently raided Algerian territory, and one of the excuses for the French occupation of Tunis in 1881 was the need to subdue them and to establish security for European colonization in eastern Algeria.

Industry and Commerce

There has been limited European colonization in the Tabarka district. A market is held on Fridays. The principal industry is fishing for anchovies and sardines, and the port is visited annually

by Italian (mainly Sicilian) fishermen between January and August: there is also some coral-fishing. There are iron-ore and lead deposits at Ain Alléga, about 8 miles from Tabarka. The trade of the port consists almost exclusively of exports, mainly cork with small quantities of tannin, charcoal, and other forest products. In 1937 only 106 tons were imported and 5,627 tons exported by 50 vessels of a total tonnage of 25,268.

Description of Port

The harbour is between the island and the mainland. The eastern side is protected by the rubble breakwater connecting the island and the mainland, and the western side by two jetties: one of these projects south-westward from the island and the other north-north-eastward from the Pointe des Aiguilles. The entrance facing north-west is between these jetties. Another jetty, with a depth of 18 feet at its head, extends from the south-eastern side of the island. The depths in the harbour vary between 6 and 12 feet. There are some rocks in the northern corner and a buoy in the middle of the harbour.

Facilities. Tabarka had few facilities before the present war apart from a good water-supply and two small oil tanks. Information regarding damage and modification in the port during the war is not available for publication.

Communications

Rail: Tabarka is the terminus of a normal-gauge line from Mateur which was built primarily to serve the iron-ore mines of the Nefzas district at Douaria and Tamera.

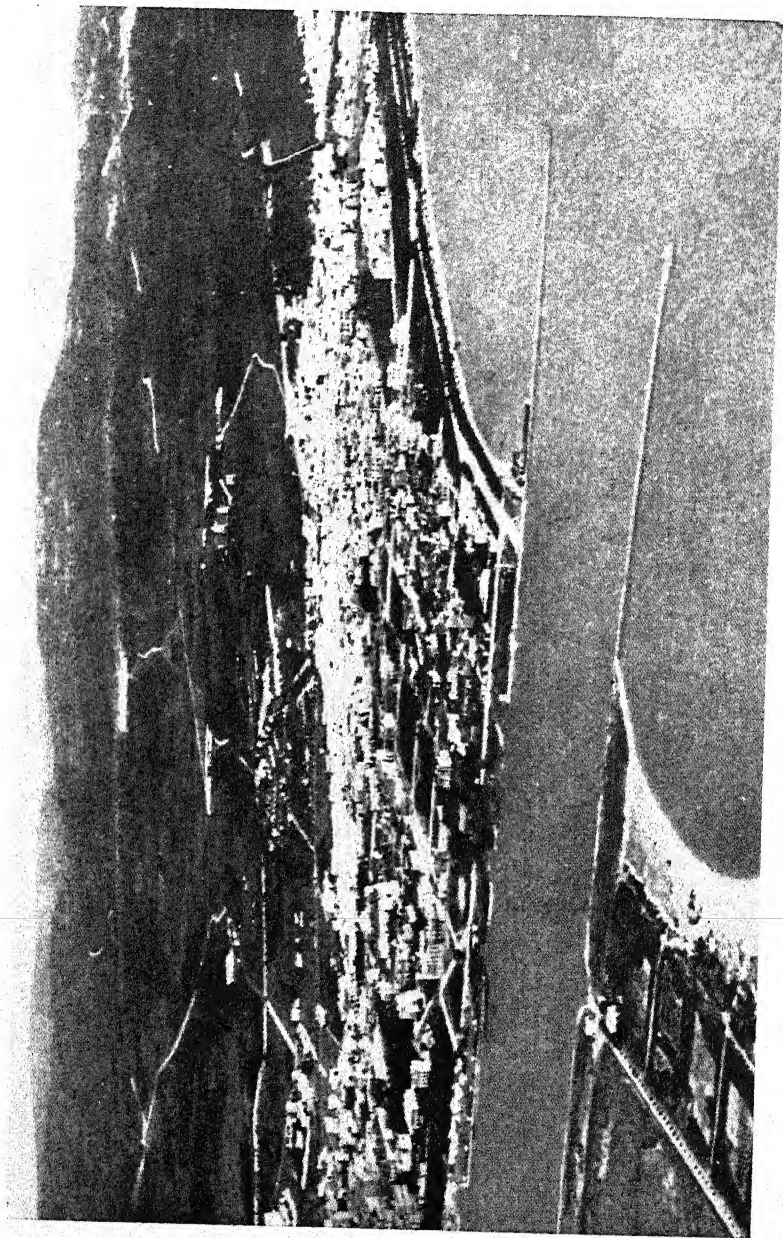
Road: Roads lead west to Oum Teboul and la Calle in Algeria, south along the valley of the Oued el Kebir to Ain Draham and the Medjerda valley at Souk el Arba, and east through the Nefzas basin to Mateur and Bizerta with a branch near Djebel Abiod to Béja.

BIZERTA (BIZERTE) (Figs. 43, 44; Photos. ¹¹11, 139-145, 202, 214). Lat. 37° 06' N., long. 9° 52' E. Population 28,468 (11,257 Europeans). Altitude 13 feet. Chief town of a region, a civil control, and a caïdat. Chief naval base for French North Africa. Brigade de gendarmerie. Electricity (3-phase, 110/190). Hospitals (1 civil, 1 military). Meteorological station. Hotels (17). Garages (9).

Bizerta is a first-class French naval base, occupying a commanding strategic position in the narrowest part of the Mediterranean, on the strait connecting the western and eastern basins of the sea, and less



138. *Tabarka*



139. *Biserta: the Chenal in foreground*

than 150 miles from Sicily. Gibraltar is 743 miles west, Malta 242 miles east-south-east, Alexandria 1,056 miles east-south-east, and Toulon 450 miles north-west. The port is at the entrance to the Lac de Bizerte on the western shore of Bizerta Road (also known as the Baie de Bizerte), which extends from Cap Bizerte (Guardia) to Ras Zebib. The town of Bizerta, which is 76 miles by road from Tabarka and 40 miles from Tunis, is dominated by Djebel Kebir, which rises to 900 feet about 3 miles to the north-west. To the south-east is Djebel Touila (252 ft.) between the Lac de Bizerte and the sea. Most of the town lies on the north-western side of the Chenal de Bizerte, extending as far north as Fort Sidi Salem.

The Lac de Bizerte lies south of the town and harbour of Bizerta, to which it is linked by the Chenal de Bizerte and the Goulet du Lac: there are several bays on the north-western side of the Goulet, used for commercial and naval purposes. The lake has an area of about 50 miles and is very rich in fish, especially mullet. A dredged channel leads across it to the naval dockyard at Sidi Abdallah, near Ferryville, in the south-western corner. The Garaet Achkel (Ichkeul, Ishkel) is a large but shallow lake on the south-western side of the Lac de Bizerte, to which it is drained by the Oued Tindja. The Garaet Achkel and the Lac de Bizerte are dominated to the south by Djebels Achkel and Kechabta respectively.

The roadstead off the harbour is more sheltered and the holding ground better than at the other open anchorages off northern Tunisia. Large vessels can anchor, in depths of about 50 feet, three-quarters of a mile to the east of Fort Sidi Salem: this position is sheltered from north-west, but not north and east, winds. Anchorage can also be obtained in the northern part of the Avant Port, as close to the Jetée Nord as practicable. Small vessels should always take shelter in the Avant Port.

History

Bizerta was the ancient Hippo Diarrhytus (also known as Hippou Akra), a Phoenician colony of the fourth century B.C.: its harbour, protected from the north-east wind by a pier, was one of the safest on this coast. Later it became a Roman colony. In A.D. 661 it was conquered by Moaouia ibn el Hadaj and given the name Benzert. The Hafsite ruler el Mostansir rebuilt much of the town between 1249 and 1254. Moors driven from Spain settled in Bizerta at the end of the fifteenth century, building a special Andalusian quarter, Houmt Andeless (now the suburb of les Andalouses). After Khair

ed Din had taken Tunis in 1534, the people of Bizerta threw in their lot with him, and when he was expelled from Tunisia allowed a Turkish garrison to be installed. In 1535, however, Andrea Doria

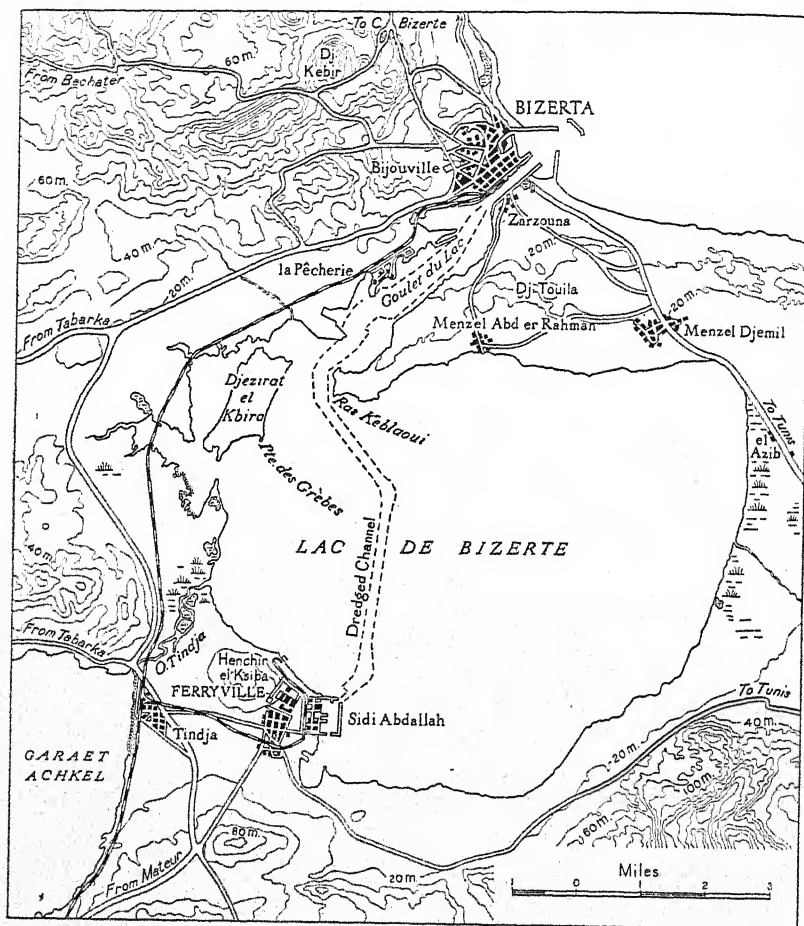


FIG. 43. *The geographical setting of Bizerta (Bizerte) and Sidi Abdallah*

was sent by Charles V and captured the city, massacring many of its inhabitants. Years of neglect followed and the port silted up: the town was saved from complete ruin, however, by the lake fisheries. Between 1620 and 1642 the dey Youssef restored Fort Sidi Salem and built four fountains. During the seventeenth and eighteenth centuries Bizerta was a corsair headquarters despite bombardments

by the French in 1770 and the Venetians in 1785. In May 1881 the port was occupied by the French fleet without resistance. The French minister Jules Ferry is reported to have said, 'Si j'ai pris la Tunisie, c'est pour avoir Bizerte', although at the time the great strategic possibilities of the site do not appear to have been particularly recognized.

In 1890 the Bey's Government granted a concession for the building of a new harbour and canal, which was completed in 1895: the material excavated was used to fill up the old canal, which passed through the old town, and to reclaim land near the present passenger and goods stations. The French Mediterranean fleet entered Bizerta in July 1896, but as the Avant Port and the Chenal were not sufficiently large or protected for the whole fleet, a further concession was granted in 1899 to the Compagnie du Port de Bizerte. Since 1900 work has proceeded at first rapidly and then intermittently, but in recent years at a fairly steady pace. The arsenal and dockyard at Sidi Abdallah (p. 242) near Ferryville were planned by Admiral Merleaux-Ponty, who died in 1902. Under the terms of the Franco-Italian armistice of 1940, Bizerta was demilitarized.

Description of Town

Modern Bizerta consists of two parts, the old native quarter and the modern town. The native quarter, immediately west of the Vieux Port, has changed considerably in recent years, though it retains many of its ancient characteristics. As recently as 1890 the canal joining the Lac de Bizerte to the sea passed through this quarter, part of which lay on an island in the canal: the Vieux Port represents the downstream portion of this canal. With the dredging of the present Chenal the island has been joined to the mainland, and much of the land to the south has been reclaimed and altered out of all recognition. The Kasba, immediately north of the channel joining the Vieux Port and the Avant Port, remains, as do parts of the ancient walls: but the Fort d'Espagne, built by Euldj Ali between 1570 and 1573 to command the town from the north, has been converted into a modern fortress, and the southern walls have been removed to make way for the new European town, which lies between the native quarter and the north-western side of the Chenal. Modern Bizerta is laid out on a regular pattern and is centred on the Square Foch, in which are the Town Hall, the post office, and other public buildings. In recent years the town has extended westward into the suburb of Bijouville near the Baie de Sebra or Port de Commerce,

and also across the Chenal to Zarzouna. Bizerta is now the fourth town in Tunisia, the population having grown steadily from less than 20,000 in 1921 to 25,872 in 1936: this latter figure included 8,054 Frenchmen, 2,980 Italians, and 1,342 Jews.

There are barracks for several thousand troops in and around Bizerta, particularly between the old town and Bijouville. The fortifications built for the protection of the port are in three groups—the older works surrounding the town, the group of coastal batteries on the high ground of Cap Bizerte (Guardia) centred around the fort on Djebel Kebir, and the batteries on the narrow ground between the sea and the lake to the east of the town, the highest being that at Djebel Touila.

Industry and Commerce

Bizerta has a smelter for the reduction of lead ores (p. 325) and a number of factories making canvas, mineral waters, olive-oil, macaroni, spaghetti, and other products. Fishing is a leading industry, both sea-fishing and in the Lac de Bizerte: tunny, sardines, and mullet are the principal fish caught, and the Tunis market is supplied. A market is held daily in the town, with special markets for cattle on Tuesdays and horses on Thursdays.

Besides being a naval base Bizerta has developed as a commercial port and is now the fifth port in Tunisia, although efforts to make it a bunkering port have not been very successful. For its mineral traffic it competes, to some extent, with Bône in eastern Algeria. Iron ore from Douaria and Tamera in the Nefzas district is the principal export, followed by cereals, wine, lead ore, zinc ore, and cork. The chief imports are coal, fuel, and general merchandise. Bizerta has a fairly balanced trade compared with other Tunisian ports. In 1937 imports amounted to 157,285 tons and exports to 217,863 tons. In the same year Bizerta was visited by 417 vessels of 712,216 tons, and 49,295 passengers used the port.

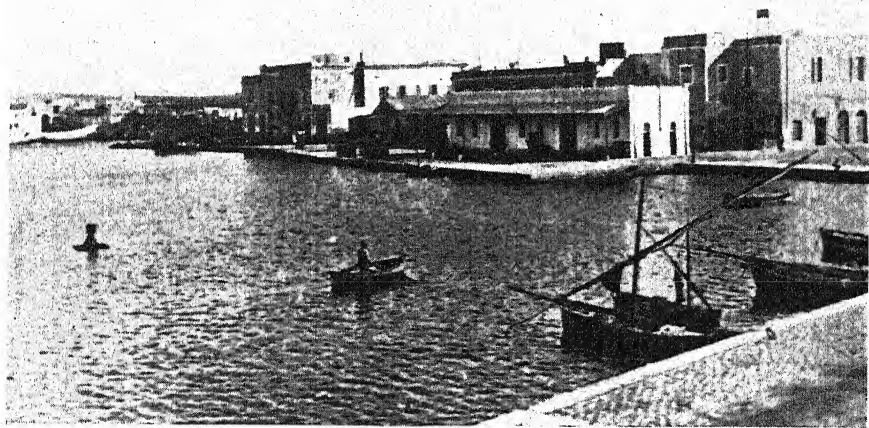
Description of Port

Note. Since the main channel was dredged to 39 feet in 1939, the depths alongside some of the quays given below are subject to modification, but information is not available for publication.

Bizerta harbour consists of two basins, the Avant Port and the Vieux Port, but the port also includes the Chenal de Bizerte, the bays in the Goulet du Lac, the Lac de Bizerte itself, and the harbour at Sidi Abdallah. Pilotage is compulsory within the harbour entrance.



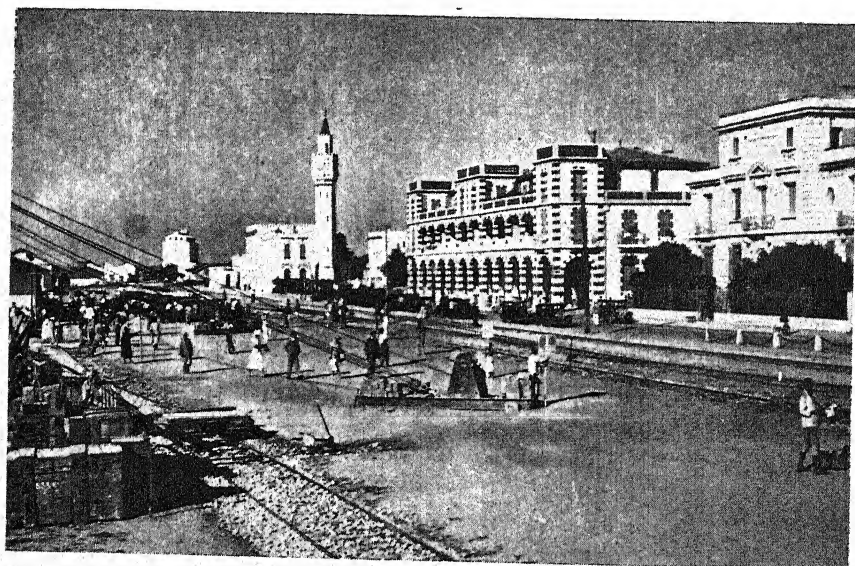
140. *Bizerta: the Vieux Port*



141. *Bizerta: the Vieux Port*



142. Bizerta: north-west side of the Chenal



143. Bizerta: quay on north-west side of the Chenal

The level of the sea is affected by the winds and by rain, and in the Goulet du Lac may vary by as much as 3 feet. In fine weather there is a regular tidal stream through the Chenal, but it is considerably affected by the wind: it turns at high and low water.

Avant Port (Photo. 145). The Avant Port covers 220 acres and is protected by the Jetée Nord (nearly 4,000 ft. long), the Jetée Est (3,100 ft.), and a detached breakwater (2,300 ft.) across the entrance to the harbour. General depths are from 32 to 33 feet, but there are several patches of rock or sand with depths over them of less than 30 feet, and 29½ feet is considered the safe maximum depth. There is no restriction as to length. The largest vessel accommodated in the port is the S.S. *Roma* (32,583 tons). Except in the channel leading to the Lac de Bizerte, the depths are shoal within 300 yards of the south-western side of the harbour, where silting may occur.

On the inner side of the Jetée Est there are three iron piers, with an oiling berth across their heads and a depth alongside of 30 feet.

Vieux Port (Photos. 140, 141). The Vieux Port covers about 7 acres and has a few small quays. It is used only by fishing-vessels drawing 8 feet or less. It is entered from the north-western corner of the Avant Port, near the root of the Jetée Nord.

Chenal de Bizerte (Photos. 139, 142-144). The Chenal de Bizerte joins the Avant Port and the sea with the Baie de Sebra and the Goulet du Lac. It is about 2,600 feet long and 787 feet wide, and is entered from the Avant Port between two jetties, the Cavalier Nord and the Cavalier Sud. It was dredged to 39 feet in 1939, except close along either side. The north-western side has a quay, 1,300 feet long, where vessels drawing up to 30 feet can secure: this is succeeded to the south-west by a number of pontoons, where vessels can also secure, with more quays farther south-westward, built on reclaimed land near the railway goods station and extending as far as the entrance of the Baie de Sebra. On the south-eastern side of the Chenal, near the root of the Cavalier Sud, there is an oiling berth.

Goulet du Lac. The Goulet du Lac extends from the south-western end of the Chenal to Ras Keblauoui and the island of Djezirat el Kbira, at the entrance to the Lac de Bizerte. Along the sides of the Goulet, particularly the north-west, are several bays, the chief of which are described below.

The *Baie de Sebra* (or Port de Commerce) is entered between the north-western point at the south-western end of the Chenal de Bizerte and Pointe Sebra (half a mile south-westward), on which is a light indicating the axis of the Chenal. Its northern and eastern

parts were dredged to a depth of $26\frac{1}{2}$ feet in 1936, and wharves were built along its northern side. There is an iron-ore quay belonging to the Société des Mines de fer de Douaria, 1,215 feet long with a depth alongside of 26 feet, and a small coaling quay owned by the Société Tunisienne de Houilles et Agglomérés. The iron-ore loading machinery can deal with up to 5,000 tons per day.

The *Baie Ponty*, reserved for naval and government use, extends from the Pointe de l'Amirauté to the Pointe de l'Infirmerie, about 400 yards south-south-westward. The larger jetties are used as destroyer pens. Near the Pointe de l'Infirmerie are two quays, 400 and 540 feet long, with depths alongside of 23 feet. Behind the bay is the station of la Pêcherie.

The *Baie de Seti Meriem*, used as a submarine base, is entered between the Pointe de l'Infirmerie and Ras el Krem. There are some submarine pens with depths of about 23 feet, and an oiling berth (diesel oil) with a depth of 33 feet. There are some barracks and workshops at the northern end of the bay.

The *Baie Karouba* extends from Ras el Krem to Pointe Karouba, which are about 700 yards apart: it is used as a seaplane base.

The *Anse de Mensel Smail* is south-west of the Baie Karouba: on its south-western side the island of Djezira Srira has been joined to the mainland by reclamation. Between this reclaimed area and Pointe du Douar, the north-western extremity of the island Djezira el Kbir, is the Baie de Bellaouidet.

The *Baie des Carrières* is the only bay of any size on the south-eastern side of the Goulet. It extends from the Pointe de la Carrière to the Pointe du Chacal. On its eastern side is a large underground fuel and ammunition store.

Lac de Bizerte. Parts of the Lac de Bizerte have depths of 30 feet or more, but much of the shore is fringed with a bank with 18 feet or less over it. The lake is crossed by a channel, 650 feet wide and dredged in 1939 to 39 feet, joining Bizerta and the Goulet du Lac with the naval base at Sidi Abdallah. The western shore is generally low and marshy: the Oued Tindja, flowing from the Garaet Achkel, enters the lake to the north-west of Ferryville. The northern shore is backed by hills which culminate in Djebel Touila, on the southern side of which are the large villages of Menzel Abd er Rahman and Menzel Djemil. The eastern and southern shores are low and backed by hills.

Sidi Abdallah. The artificial harbour of Sidi Abdallah, covering about 120 acres in the south-western corner of the Lac de Bizerte, is

protected on three sides by jetties. The entrance is in the north-eastern corner and is about 300 feet wide: most of it has been dredged to a depth of 33 feet. The naval dockyard, on its western side, has four dry docks (the largest being 820 ft. long), repair shops, and coaling and other jetties. It is used solely for repairs: before the present war destroyers and cruisers were sent from Toulon to Sidi Abdallah for docking and refit. The arsenal covers 120 acres. About three-quarters of a mile to the north-west is a small harbour for explosives, with a depth in it of 10 feet. Most of the dockyard and arsenal employees, numbering about 1,500 in 1939, live in the modern town of Ferryville (p. 208).

Facilities. In view of the damage done during the present war to the port of Bizerta, particularly to its installations, little information regarding facilities can usefully be given. Before the war there were numerous lifting appliances at both Bizerta and Sidi Abdallah, three sea-going and about a dozen harbour tugs, and a large number of lighters and other small craft. Minor repairs could be effected in a small shipyard in Bizerta, but large repairs were sent to Sidi Abdallah.

Coal and oil fuel were stored in considerable quantities: there were coaling quays in the Baie de Sebra and at Sidi Abdallah; oil fuel was available in the Baie Ponty and at Sidi Abdallah, and diesel oil in the Baie de Seti Meriem. There were also oiling berths on the Jetée Est and in the Chenal. The electric power station was on the neck of the Pointe de l'Infirmier: another station adjacent to the railway goods station was used as a standby.

Water is supplied at the quays, and before the war there were two tank vessels and a water-tug. The principal water-supply comes by gravitation from springs at Ain bou Ras, near el Alia, a village 7 miles south-east of Menzel Djemil. The main city and military reservoirs are on the hill to the west of the town above the Fort d'Espagne.

Communications

Rail: Bizerta is the terminus of the normal-gauge line passing between the Lac de Bizerte and the Garaet Achkel through Tindja to Mateur, whence there are lines south-east to Tunis, south-west to Béja and the Algerian railway system, and west to Tabarka. The station, built in neo-Moorish style, is on the north-western side of the Chenal, with the goods station about 300 yards to the west (Photo. 214).

Road: The principal roads are those to Tunis, passing between the Lac de Bizerte and the sea, and to Mateur, passing between the

lakes through Tindja. Ferries connect the town with the Bizerta-Tunis road across the Chenal: the chief ferry has replaced the transporter-bridge used before the widening of the Chenal (Photo. 202). There is a network of roads in the country north-west of the town.

LA GOULETTE (GOLETTA) (Figs. 45, 46; Photos. 64, 146-148). Lat. $36^{\circ} 49' N.$, long. $10^{\circ} 18' E.$ Population 10,862 (6,851 Europeans). Altitude 10 feet. Chief town of a caïdat. Electricity (3-phase, 110/190). Dispensary. Hotels (2). Garage.

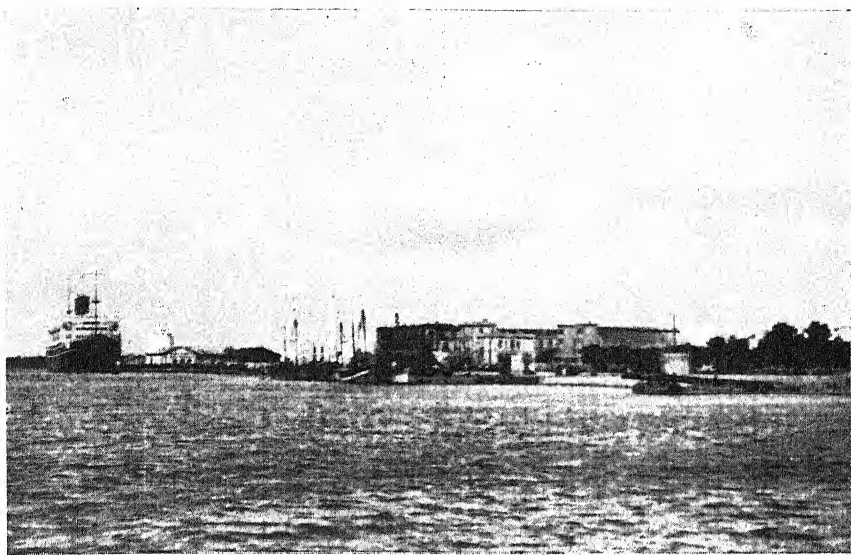
La Goulette, from the Italian Goletta, a translation of the Arabic *foun* or *halk* (throat), is on the narrow strip of land separating the Lac de Tunis from the Golfe de Tunis, and on the northern side of the ship canal, the Canal de Tunis, which links Tunis with the sea. It stands on the western shore of the Baie de Tunis (the head of the Golfe de Tunis) in the centre of a sandy strip of beach extending from near Salammbôo in the north to Maxula-Radès and the mouth of the Oued Miliane in the south. It is about $2\frac{1}{4}$ miles south of the ancient port of Carthage and 5 miles south-west of Cap Carthage. Tunis is about 5 miles west of the port, Bizerta (through Tunis) 45 miles north-west by road, and Sousse about 90 miles south.

The anchorage off the port is sheltered only from winds between south and west, and is sometimes dangerous in winter, although the holding ground is good and the depths shoal regularly towards the shore. The spring tidal range is $3\frac{1}{2}$ feet. Tidal streams in the Canal de Tunis do not exceed 1 knot.

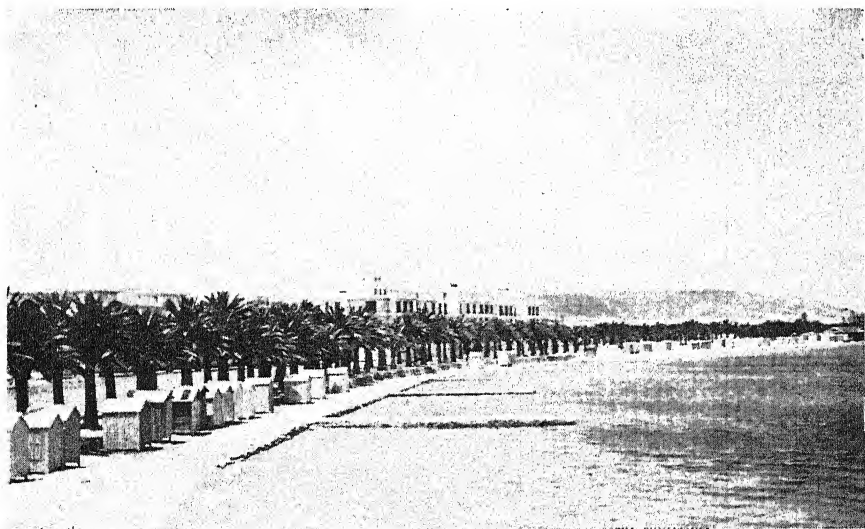
History

The history of la Goulette is inseparable from that of Tunis (described on pp. 249-250), for which it served as a port until the dredging of the canal across the Lac de Tunis. The principal event in its history was its capture by the Emperor Charles V in 1535, when the pirate Khair ed Din (whose name survives in the adjacent settlement of Khéredine) was in control of the city of Tunis. Charles seized the whole of the pirate's fleet sheltering in the small canal (now the Ancien Canal) and 300 brass cannon, and released thousands of Christian slaves imprisoned in the Kasba. The Spanish strongly fortified la Goulette, which became the key point of their hold on the country, but in 1574 the town fell to the Turks after a long siege.

The improvements by which Tunis itself has become a leading port have been carried out since the French occupation of Tunisia,



144. *Bizerta: north-west side of the Chenal*



145. *Bizerta: west side of the Avant Port*



146. *La Goulette from the south-west*



147. *La Goulette: the Ancien Canal*

but though la Goulette has lost much of its trade to Tunis, this has been offset by the great increase in the mineral traffic passing through the port.

Description of Town

La Goulette is a suburb of Tunis rather than an independent town. It consists of two quarters, the old town (la Goulette Vieille) in the south and the new town (la Goulette Neuve) in the north. The old town, built partly with the stones of old Carthage, extends as far south as the Kasba, a citadel built by the Spanish and Turks in the sixteenth century and now used as a prison, and the Ancien Canal. This canal, which formerly linked the Lac de Tunis with the sea, separates la Goulette Vieille from an island on which are a disused arsenal, various military buildings including barracks, and the Dar el Bey, a former palace of the Beys (Photos. 147, 148).

North of the new town the built-up area extends almost continuously through Khéredine and le Kram to Salammbôo, where an oceanographical institute was established in 1924. The whole district is a popular sea-side resort for the poorer inhabitants of Tunis and consists mainly of villas and bathing establishments. Just north of Salammbôo is the ancient port of Carthage, which covered about 70 acres (Photo. 61). Modern Carthage is less than 1 mile farther north.

La Goulette is, with Ferryville, the only town in Tunisia with a majority of European inhabitants: its population in 1936 consisted of 6,851 Europeans (3,801 Italians) and only 4,011 natives (including 1,668 Jews). During the summer months the population is sometimes between 40,000 and 50,000.

Industry and Commerce

Besides being a port and sea-side resort, la Goulette is a fishing-centre with a fleet of about 100 vessels, some sea-going and others used only on the Lac de Tunis. It has a daily market. As a port, la Goulette has lost much of its trade with the improvement of the Canal de Tunis and of the port of Tunis itself, mainly since 1893: its external trade is still surpassed, however, only by Sfax and Tunis. In 1937 the total trade amounted to 905,128 tons, of which exports (principally iron ore) accounted for 772,683 tons; this figure was exceeded only by Sfax, which, like la Goulette, is primarily a mineral-exporting port. Most of the iron ore mined in central Tunisia passes through la Goulette, to which there is a branch of the Tébessa-Tunis railway

from Bir Kassa. The two main companies using the port are the Société des Mines de Djebel Djerissa and the Société des Mines de fer de Djebel Slata et Djebel Hameima, which have special installations and loading appliances on the southern side of the Canal de Tunis. Most passenger ships pass through the canal to Tunis,

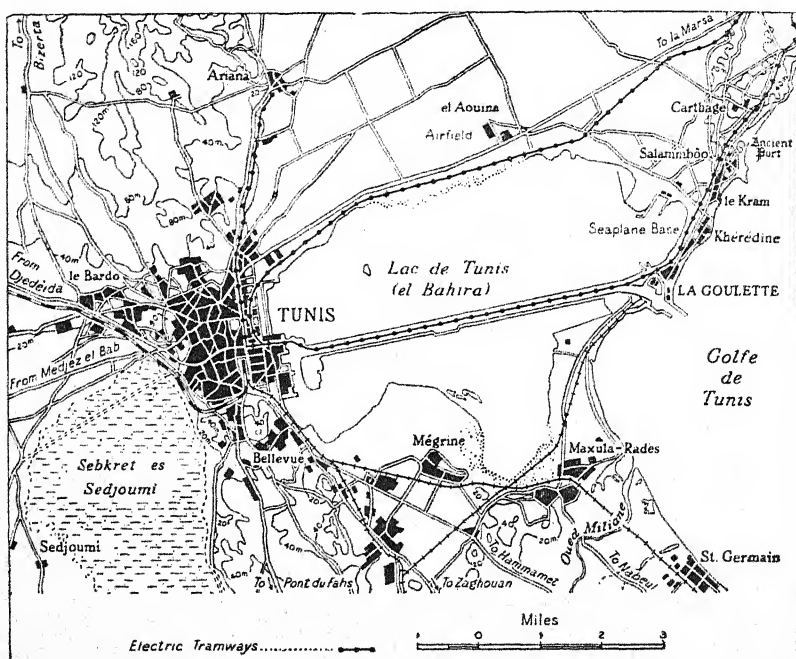


FIG. 45. *The geographical setting of Tunis and la Goulette (Goletta)*

though 3,332 passengers landed or embarked at la Goulette during 1937. Altogether 292 vessels of 500,822 tons entered the port in that year, excluding the 1,401 ships of 1,807,056 tons which continued to Tunis.

Description of Port

La Goulette stands at the entrance of the dredged channel leading across the Lac de Tunis to the port and city of Tunis. It is entered between two parallel jetties, the Jetée Nord and the Jetée Sud, which extend south-eastward: from the entrance a channel, 328 feet wide and 28 feet deep, has been dredged in an east-south-easterly

direction for about $1\frac{1}{2}$ miles. Pilotage is compulsory for all vessels entering la Goulette or the Canal de Tunis. Navigation in the port is permitted to vessels drawing up to 26 feet.

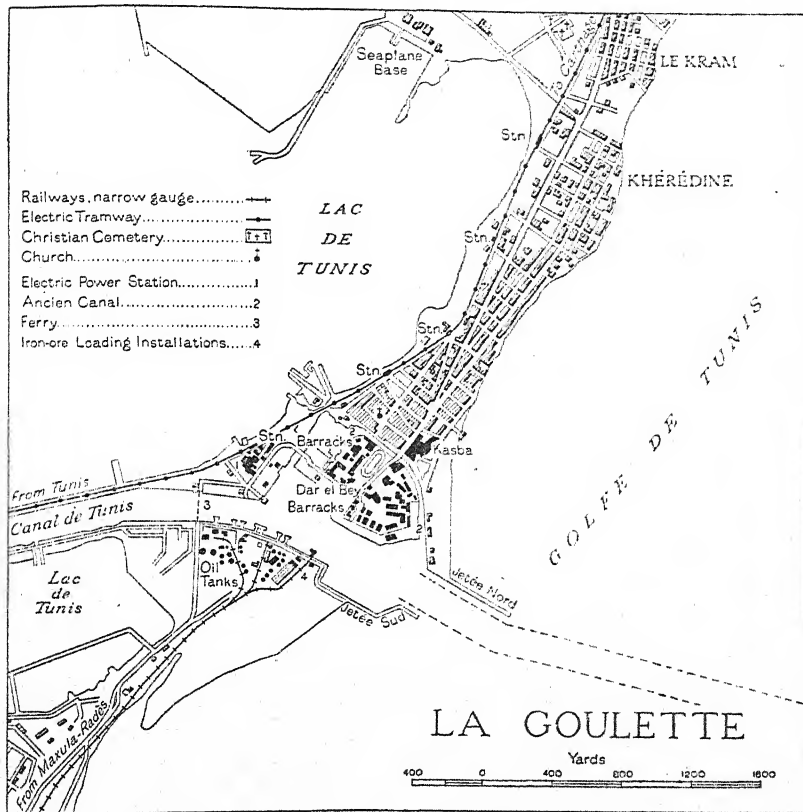


FIG. 46. *La Goulette (Goletta)*

On the northern side of the harbour is a basin with depths of 28 feet at the quays, to which vessels can secure. This basin communicates with a smaller basin to the north with depths of only $6\frac{1}{2}$ feet. There is a third basin on the southern side of the harbour with rubble embankments on its western and southern sides, and a berth for large passenger steamers. There are two wharves for loading iron ore and two oil-fuel wharves along the southern side of the eastern extremity of the Canal de Tunis.

The Ancien Canal is about 40 feet broad and about $8\frac{1}{2}$ feet deep and has over 1,000 feet of quays for lighters (Photo. 147).

Lac de Tunis. Between la Goulette and Tunis is the shallow Lac de Tunis or el Bahira ('the little sea'), covering about 50 square miles and abounding in fish and water-fowl. There is a seaplane base in the lake near Khéredine. A channel, the Canal de Tunis, has been dredged across the lake: it is about 5 miles long and available to vessels drawing up to 20 feet (Photo. 150). For a width of 50 feet on either side of the centre line it is dredged to a depth of $21\frac{1}{2}$ feet, the sides of this dredged channel being marked by pairs of buoys. Near the middle of the canal is a stopping-place or *gare*, 1,625 feet long and 140 feet wide, to enable vessels to pass one another. In 1934 H.M.S. *Delhi* and H.M.S. *Despatch*, each 473 feet long, passed through the canal. Material dredged from the channel was used to form the banks of the canal; the northern bank is followed by the electric tramway from la Goulette to Tunis. A steam-ferry crosses the canal near la Goulette.

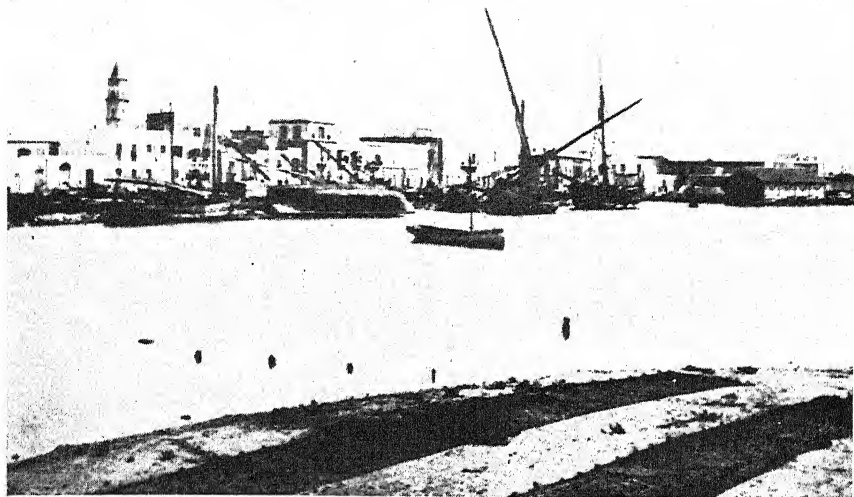
Facilities. Information regarding the existing facilities is not available for publication. In 1939 there were no lifting appliances at la Goulette apart from those belonging to the iron-ore companies on the southern side of the harbour: the harbour craft of la Goulette and Tunis included three sea-going and seven other tugs, numerous lighters (mostly non-self-propelled), three steam trawlers, and other fishing-craft. There was one dry dock, 137 feet long and $10\frac{1}{2}$ feet deep, a slipway capable of accommodating vessels of up to 350 tons displacement, and several other slips on the southern side of the port. Though there were no warehouses, there was ample stacking space to the south of the town, where the buildings are widely separated.

Fair stocks of coal were maintained, and oil fuel could be supplied alongside the quay on the southern side of the port, and diesel oil by lighters. The electric power station, which supplied the whole of the Tunis area and was by far the largest station in the country, was south-west of the town and on the northern side of the Canal de Tunis.

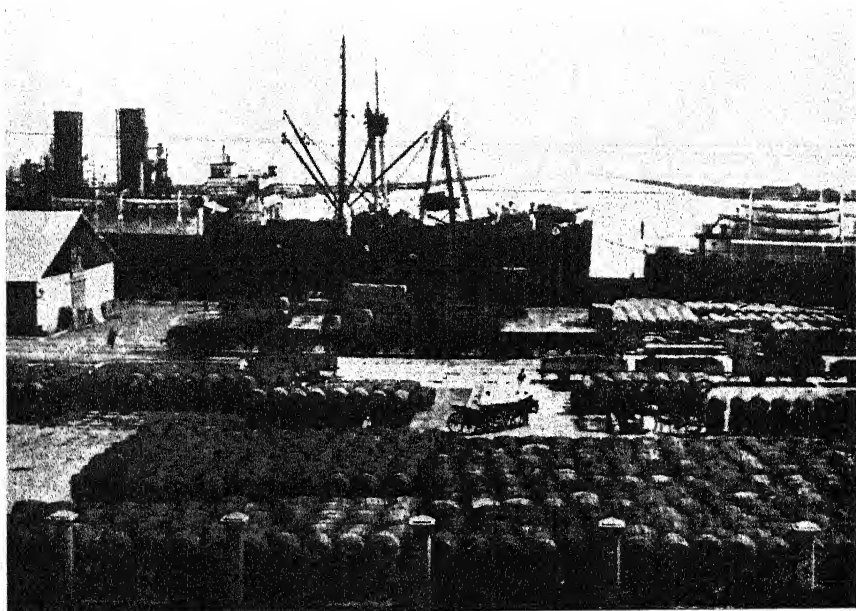
The water-supply is the same as that of Tunis (p. 255, Fig. 47): it is supplied from hydrants, but only limited quantities are available in the summer.

Communications

Rail: Electric tramways connect la Goulette with Tunis along the northern side of the Canal de Tunis and with la Marsa through Khéredine and Carthage. A narrow-gauge railway, used mainly for



148. *La Goulette Vieille*



149. *Tunis: the Bassin Principal*



150. *Tunis: the Canal in background*

the transport of minerals from the Djebel Djerissa district of the Monts de Tébessa, crosses the Tunis-Sousse line and joins the Tunis-Tébessa line at Bir Kassa: a branch through Mégrine passes round the southern side of the Lac de Tunis to Tunis.

Road: The road leading north from la Goulette divides at Khérédine, one branch going to Tunis through el Aouina (the principal airfield near Tunis) and the other continuing north to Carthage and la Marsa. The road to the south passing through Maxula-Radès connects with the roads from Tunis to the Cap Bon peninsula and the east coast generally: this road is joined to la Goulette town by a steam-ferry across the Canal de Tunis.

TUNIS (Figs. 45, 47, 48; Photos. 17, 122, 123, 149-154). Lat. $36^{\circ} 48' N.$, long. $10^{\circ} 12' E.$ Population 219,578 (98,877 Europeans). Altitude 13 feet. Chief town of a region, a civil control, and 2 caidats. Compagnie de gendarmerie. Court of first instance and mixed tribunal. Electricity (3-phase, 110/190 and 220/380). Gas. Hospitals (6 civil, 1 military). Hotels (about 50). Garage (about 75).

Tunis is the capital of Tunisia and one of its largest ports, the seat of the Resident-General, and the headquarters of the French administration and military forces in the country. The city is built on an isthmus between two salt-lakes, the marshy Sebkret es Sedjoumi and the shallow Lac de Tunis or el Bahira: it is joined to the port of la Goulette and the sea across the Lac de Tunis by the Canal de Tunis, about 5 miles long. It is 40 miles south-east of Bizerta by road, 90 miles north of Sousse, and 100 miles north-east of Kairouan.

Formerly the Bey spent much of his time in Tunis, but since the French occupation he lives generally at la Marsa in the summer and at Hamman Lif in the winter: when in Tunis he uses the Dar el Bey in the native town, and, on ceremonial occasions, the palace of le Bardo, about 2 miles west of the city. The Dar el Bey at la Goulette is no longer used.

History

Tunis, the ancient Tunes or Thines, is probably more ancient than Carthage, of which city, however, it became a dependency. Its importance dates from the Arab conquest, when it became the capital and took over the political and commercial functions previously exercised by Carthage. It was used as a port by those going from the holy city of Kairouan to Spain, and under the Aghlabite dynasty

(A.D. 800-909) was reputed to have been larger than Cairo, with a population of 100,000 or more. It suffered severely during the tenth-century wars of the Fatimite caliphs with the Sunnites and with the desert nomads. In 1270 the city was attacked unsuccessfully by Louis IV of France, who died soon afterwards in his camp at Carthage. The pirate Khair ed Din (Barbarossa) captured the town in 1534, expelling the Hafsite prince, but a year later Tunis fell to the Emperor Charles V, who maintained his hold until 1574. From then until the French occupation of 1881 Tunis remained in Turkish hands, and was the capital and chief town of Tunisia, so that its history is inseparable from that of the country as a whole, described in Chapter VII. Tunis was entered by French troops on 12 May 1881, when terms were dictated to the Bey in the palace of Kassar Said, near le Bardo.

Prior to the French occupation, la Goulette served as the port of Tunis. In 1880 the Bey granted a concession to the Bône-Guelma (Railway) Company for the construction of a port on the eastern side of the city and the dredging of a channel across the Lac de Tunis. As a result of the establishment of the French protectorate, the contract was cancelled in 1885, and the work undertaken by the Société des Batignolles. The port was opened to navigation in 1893. Subsequent extensions were carried out by the firm of Duparchy and Préault, which was converted in 1894 into a joint-stock company, the Compagnie des Ports de Tunis, Sousse, et Sfax; this company still manages these three ports on behalf of the Government. The basin for the shipment of phosphate and other minerals was opened in 1905.

Description of Town

Tunis consists of distinct native and European towns; the former is on the side and foot of gently sloping hills, and the European quarter has grown up, mostly during the last sixty years, on the flat land, much of it reclaimed, between the native town and the western shore of the Lac de Tunis.

The native town consists of three parts, the Medina or city proper, with the suburbs of Bab Souika and Bab Djazira to the north and south respectively (Photo. 153). It has changed little since the French occupation, retaining its oriental aspect, though the walls surrounding the Medina have been replaced by a ring of boulevards, and much of the ancient Kasba has been demolished to make way for barracks for French troops. The Kasba occupies the western and

highest part of the city: besides being a fortress it formerly contained a palace of the beys, barracks for troops, and *bagnios* or prisons for Christian slaves. Immediately north of the Kasba are the Sadiki college, founded in 1875 to train government officials, and the Law Courts, both built in Moorish style. To the east are the Sadiki hospital (p. 182), the Dar el Bey, and the Great Mosque. The Dar el Bey is the Bey's town palace, but is seldom occupied by him except during the month of Ramadan, much of it being used for administrative offices: the palace contains many rooms beautifully decorated in the Moorish style of the eighteenth century. The Great Mosque or Djama ez Zitouna (the Mosque of the Olive-tree) was founded in A.D. 732 and mostly built between 856 and 863: attached to the mosque is a Moslem university. Altogether there are fifty mosques in the city, nine of them with associated schools: one of the largest is the Djama Sidi Mahrez, built at the end of the seventeenth century. A large proportion of the Jewish population of Tunis lives in the northern part of the Medina; many of them wear distinctive clothes, especially the women. The market quarter is in the southern half of the Medina: each market or souk is devoted to one particular trade, and many of them date from the remarkable commercial prosperity of the city under the Hafsites during the thirteenth century (Photo. 154). The most interesting are the Souk el Attarine (perfumes), the Souk et Trouk (clothes), the Souk es Sekajine (saddlery), and the Souk el Berka (jewellery; formerly the slave market).

Though most of the walls that formerly surrounded the Medina have been removed, the wall round the native city as a whole still stands except on the eastern side where the European quarter continues the built-up area to the lakeside. The gates still used include the Bab el Khadra on the north-east, the Porte du Miel on the north, the Bab Sidi Abd Esselem and the Bab bou Saadoun on the north-west, the Bab el Allouch, the Bab Sidi Abdallah, and the Bab Sidi Kassem on the west, and the Bab el Gorjani, the Bab el Fellah, and the Bab Alleoua on the south. All the gates on the east have been removed except the Bab el Bahar or sea-gate, now known as the Porte de France.

The poorer Moslems live in the northern suburb of Bab Souika, especially in the Halfaouine quarter, where there are numerous markets and cafés, and pottery and silk goods are made. The suburb of Bab Djazira includes a large Moslem cemetery, the Saussier barracks, and the reservoir or *château d'eau* near the Bab Sidi Abdallah from which the city is supplied. The water is brought by

aqueducts mainly from Djebel Zaghouan, Ain Djougar, and Djebel Bargou (p. 255, Fig. 47).

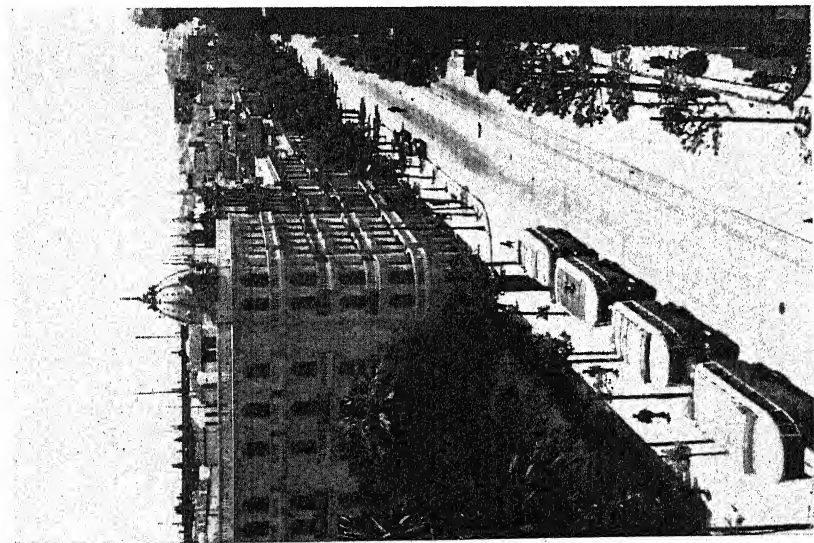
On the outskirts of the native town are three large hospitals, the military on the north-west, the civil on the west, and the Italian on the south: there is also a modern hospital maintained by Alsatian nuns in the suburb of Mutuelleville.

The European town, sometimes called the Quartier Franc or Marine, is laid out on a regular plan in blocks. The principal street runs from west to east from the Porte de France to the port: it is known first as the Avenue de France, then as the Place de la Résidence, and finally as the Avenue Jules Ferry or Avenue de la Marine (Photo. 150). Along it are hotels, banks, shops, and theatres, the Roman Catholic Cathedral, and the Residency (the palace of the Resident-General). These avenues are intersected at right angles by streets running north-south, the principal being the Avenue Gambetta behind the Esplanade, and the Avenue de Paris and the Avenue de Carthage, respectively north and south of the Avenue Jules Ferry (Photo. 151). To the north the land rises gradually to a hill, 270 feet high, on which is the Parc du Belvédère, covering 240 acres. Beyond the park are the suburbs of Mutuelleville and Cremieuxville, and the Jardin d'Essai.

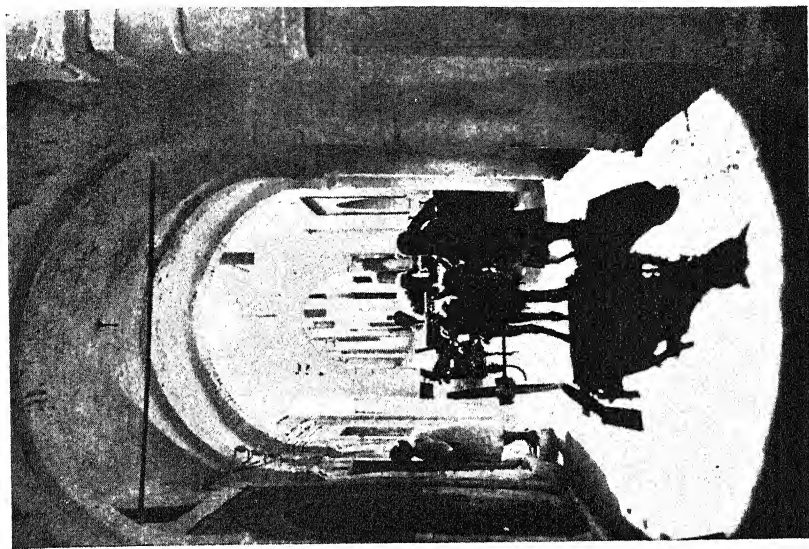
The city is spreading not only northward into these suburbs but also southward into the suburb of Montfleury and westward through el Bostane and la Rabta to le Bardo. The palace of le Bardo, used by the Bey on ceremonial occasions, includes the Musée Alaoui, the finest archaeological museum in French North Africa, and the adjacent Musée Arabe. About 300 yards west of the palace, in the middle of orange-groves, is the palace of Kassar Said where the Treaty of Kassar Said was signed on 12 May 1881.

There are a number of residential towns and villages within 12 miles or less of the centre of the city. They include Manouba on the west, Ariana (p. 203) on the north, and la Marsa (p. 218), Sidi bou Said, Carthage, le Kram, Khéredine, la Goulette (p. 244), Maxula-Radès, St. Germain, and Hammam Lif on the coast (Fig. 45). Expansion to the south-west has been prevented by the Sebkret es Sedjoumi.

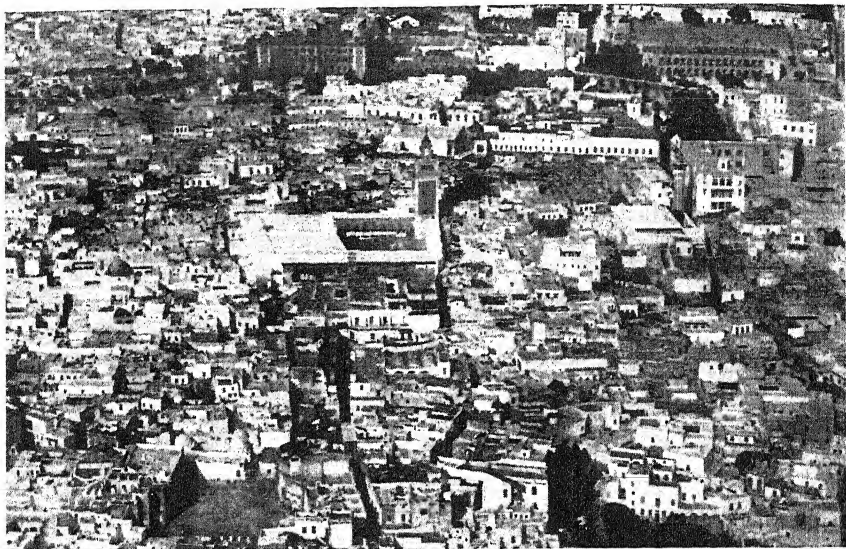
The population of Tunis with the above-mentioned towns exceeded 250,000 in 1936: the city proper had 219,578 inhabitants, including 98,877 Europeans (42,678 French, 49,878 Italians, and 4,855 Maltese) and 27,345 Jews. It has grown rapidly since the French occupation of Tunisia, especially since 1921, when its population was only



151. Tunis: the Avenue de Carthage



152. Tunis: the Rue Dar el Djeld



153. *Tunis: the old town*



154. *Tunis: the Souk des Étoffes*

scent, textiles, and carpets. There is a new plant for the treatment of low-grade zinc ores to the south of the city, in addition to the smelter for the reduction of lead ores at Mégrine (p. 325).

The principal exports are minerals (chiefly phosphate, with smaller quantities of iron ore, shipped mainly from la Goulette, lead, and zinc), cereals, wine, olive-oil, dates, and sponges: the phosphate comes mainly from the workings at Kalaa Djerda, Kalaat es Senam, and Rebiba in the Monts de Tébessa. Imports include textiles, hardware, beverages, sugar, petroleum, coal, wrought iron, steel, and timber. Although 63 per cent. of the weight of the total foreign trade in 1937 consisted of exports (711,288 tons), the trade of Tunis is fairly balanced compared with that of la Goulette, Sousse, or Sfax. Imports totalled 416,184 tons in the same year when 1,401 vessels of 1,807,056 tons entered the port. Tunis is the chief passenger port in the country (116,313 out of a total of 170,978 passengers in 1937).

Description of Port

The port of Tunis, approached from la Goulette by the Canal de Tunis (described on p. 248), consists of three basins. The canal leads directly into the central basin, the Bassin Principal, which is about 1,300 feet long and 1,000 feet wide and is dredged to a depth of 22 feet. There are quays to which vessels can secure on its northern, western, and southern sides (Photos. 17, 149). North of this basin is the small Bassin des Voiliers, which is dredged to a depth of 14½ feet and used mainly by sailing-craft: it has piers on its western side. South of the Bassin Principal is a basin used exclusively for the shipment of minerals, chiefly phosphate: it is dredged to a depth of 22 feet and has storage sheds on its western side. A channel is being dredged from this basin to the salt works at Mégrine: it will be about 2½ miles long, 82 feet wide, and 11½ feet deep.

There are about 1,800 feet of quays and wharves in the port with a depth alongside of 20½ feet, besides several quays with lesser depths.

Facilities. Owing to the war, information regarding the existing facilities in the port is not available for publication. Before the war the lifting appliances included four floating cranes (lifting 30, 8, 5, and 3 tons respectively), five steam cranes of varying capacity, and one 5-ton electric crane. Facilities for shipbuilding and repairing were few. There was ample warehouse accommodation, mainly round the Bassin Principal and on the western side of the minerals basin.

Small stocks of coal were maintained before the war, and there were ten oil-storage tanks in the area between the goods station and the minerals quay. Both the electric power station, a subsidiary of the station at la Goulette, and the tramways power station were north-west of the Bassin Principal, near the Esplanade.

Water is available from hydrants, but during the summer the supply is limited. The water comes by pipe-line from the valley of the Oued el Kebir (the upper course of the Oued Miliane), which is dammed at Sidi bou Beker (about 12 miles south-west of Pont du Fahs), from springs in Djebel Zaghouan, at Ain Djougar, and in Djebel Bargou, and also from subterranean supplies at Khlédia (south-east of Mohamedia) and in the valleys of the Oueds el Hamma and el Bakbaka on the slopes of Djebel Ressas (Fig. 47; Photos. 18, 19).

Communications

Rail: Tunis is the only point at which the normal- and narrow-gauge railway systems of the country meet. A normal-gauge line leads west to the Medjerda valley and the Algerian railway system, branching at Djedeida for Mateur, Bizerta, and Tabarka. Narrow-gauge railways go south from the city along the east coast to Sousse, Sfax, and Gabès, and south-west to le Kef and Tébessa: there are also branches near Tunis to la Goulette through Mégrine and to the lead and zinc mines of Djebel Ressas at la Laverie. The passenger station is by the Town Hall off the Avenue de Carthage, and the goods station is due west of the minerals basin in the port. There are electric tramways along the northern side of the Canal de Tunis to la Goulette, round the northern shore of the Lac de Tunis to la Marsa, and north to Ariana.

Road: Tunis is the centre of a network of good roads leading in all directions. Roads from Medjez el Bab, Mateur, and Bizerta converge on the comparatively narrow strip of land between the Sebkret es Sedjoui and the Lac de Tunis, and diverge again on the southern side of the city to the east coast and central Tunisia generally. There are roads round the Lac de Tunis to la Goulette, passing through el Aouina, where is the nearest airfield to Tunis, on the northern side, and through Mégrine on the south.

SOUSSE (SUSA) (Fig. 49; Photos. 155-158). Lat. $35^{\circ} 49' N.$, long. $10^{\circ} 39' E.$ Population 28,470 (8,645 Europeans). Altitude 30 feet. Chief town of a region, a civil control, and a caïdat. Brigade de

gendarmerie. Court of first instance and mixed tribunal. Electricity (3-phase, 110/190). Hospitals (1 civil, 1 military). Meteorological station. Hotels (12). Garage (7).

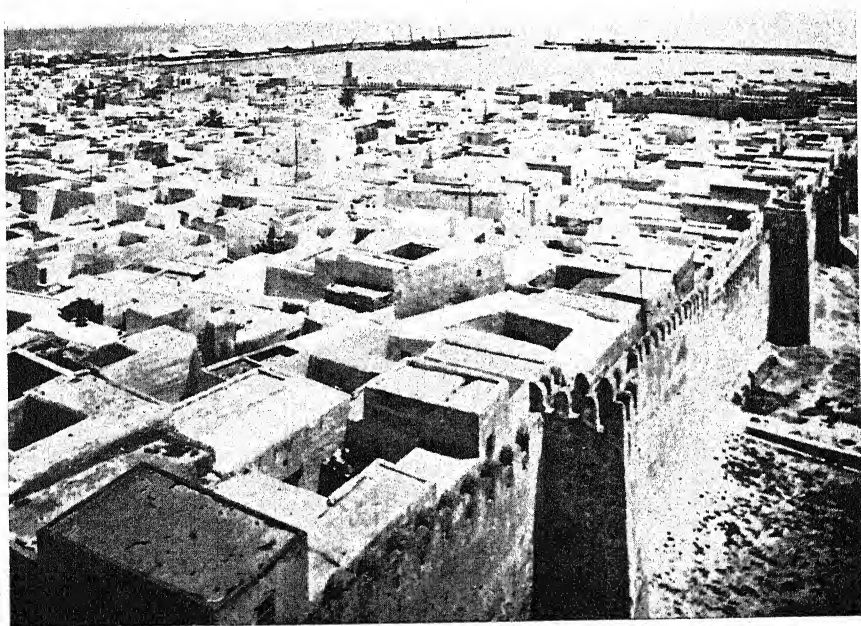
Sousse, the third largest town of Tunisia, is on the south-western side of the Golfe de Hammamet, about 90 miles south of Tunis, 14 miles west-north-west of Monastir, and 37 miles north-east of Kairouan. It stands in the centre of the Sahel of Sousse, a gently undulating region crossed by depressions, the bottoms of which are sometimes occupied by brackish sebkhas. The coast both north and south of Sousse is fringed by rocky shoals, extending seaward for half a mile or more, and is backed by dunes or cultivated plains. The town is very conspicuous from the sea because of its white walls and the high tower of the Kasba. It has a small but well-protected harbour, in which there is no rise or fall of tide, though differences of up to 3 feet sometimes occur, due to conditions of wind and weather. The roadstead is not safe, having a bad holding ground and being exposed to winds from north to south-east: in summer, however, the anchorage may be considered fairly good, because the waves are deadened by seaweed.

History

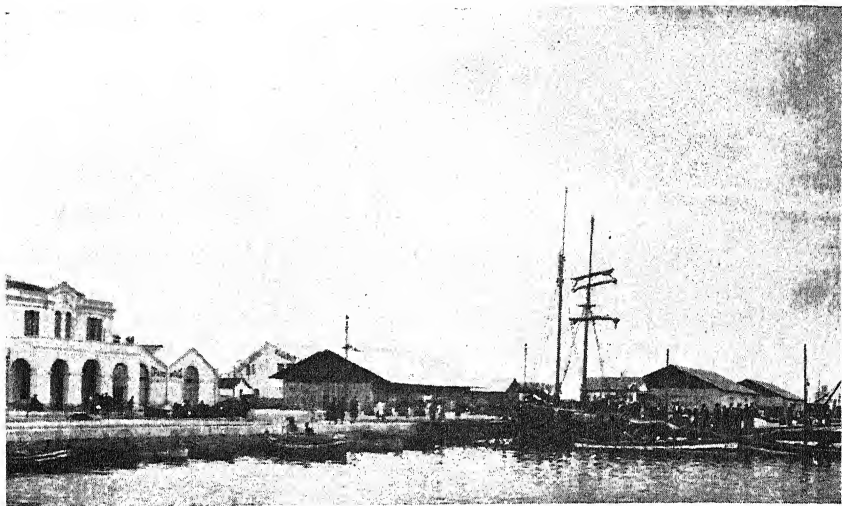
The modern town of Sousse occupies about one-third of the ancient city of Hadrumetum, founded by the Phoenicians in the ninth century B.C., before the establishment of Carthage. Hannibal made it his base against Scipio in the second Punic War. It was spared by the Romans and took sides against Caesar in the Civil War. Afterwards it became the capital of the province of Byzacena and was very prosperous. Trajan made it a Roman colony, but nearly all the buildings of this period have disappeared. The town was destroyed by the Vandals in A.D. 430, but was rebuilt by Justinian, who named it Justinianopolis. The Arabs attacked the town in 663, and in 689 captured it after the Byzantine army had been defeated at Thysdrus (el Djem). It was governed by the Caliphate of Baghdad and given its present name during the eighth century. The Aghlabites restored the town, fortifying it in 827 to serve as the port of embarkation for the invasion of Sicily. Later Sousse became the haunt of pirates who raided the coast of Italy. In the twelfth century it was held for a short time by the Normans of Sicily. It was bombarded by the Spanish fleet in 1537 and 1539, by the Venetians in 1764, and by the French in 1770, but remained in the possession of the Bey of Tunis. The French occupation in 1881 was effected without resistance.



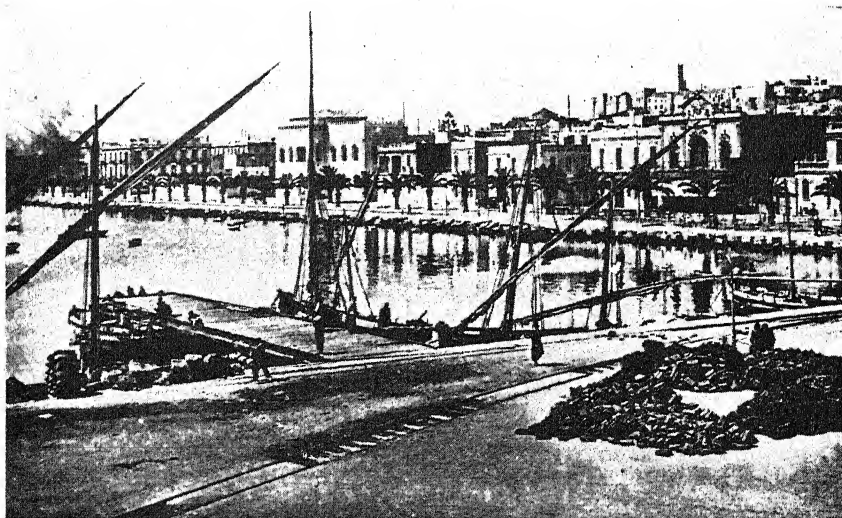
155. Sousse: view from the Ksar er Ribat towards the Kasba



156. Sousse



157. Sousse: the Quai Nord



158. Sousse: the Quai Nord and the Boulevard Armand Fallières

The old town had an artificial port, which silted up. Some of its breakwaters were discovered in 1863 and are visible near the Grande Jetée. The new port was built between 1895 and 1899, at the same time as the ports of Tunis and Sfax, and is maintained by the Compagnie des Ports de Tunis, Sousse, et Sfax, in association with the Tunisian Government.

Description of Town

The town lies on the slopes of the hills overlooking the harbour. The native quarter, which has changed little since the French occupation, occupies the centre and is surrounded by a crenellated wall with bastions and square towers. Recesses in the inner side of the wall are used as shops and stores. Many of the streets are very steep and narrow. The Kasba, surmounted by a tower now used as a lighthouse, is in the south-western corner (Photo. 155). The Great Mosque, in the north-east of the town, is the oldest of the mosques, dating from the ninth century. The Ksar er Ribat is a large square building with a high tower and seven bastions: it was originally a Byzantine fortress and then a monastery, but is now a medersa. The Kaouat el Koumba or Café du Dôme is a curious house, square at the base, then cylindrical, and surmounted by a fluted dome: it was probably a Byzantine church. Markets are held daily in the souks. There is also a market in the European quarter, which lies outside the walls on the north-eastern side of the town. This quarter has broad streets and squares and many modern villas and shops, and includes the Law Courts and other public buildings. Another suburb has grown up in recent years to the south-east of the native town.

Outside the town, to the west, are barracks and a large camp, and about a mile beyond the western gate (the Bab el Gharbi) are the remains of some Christian catacombs with more than 15,000 burial-places, and also of a large Roman cemetery.

The population of Sousse has increased steadily from about 10,000 in 1881 to 19,754 in 1921 and 28,465 in 1936: the European population of 8,645 in 1936 included 5,332 French persons, 2,882 Italians, and 298 Maltese.

Industry and Commerce

There are numerous oil and soap factories in the town and surrounding district: the largest is that owned by the Société générale des Huileries du Sahel Tunisien on the Sfax road. The only other

commercial establishments are three companies with tanks for the storage of benzine, kerosene, and diesel oil. Tunny and allaches are the principal fish caught.

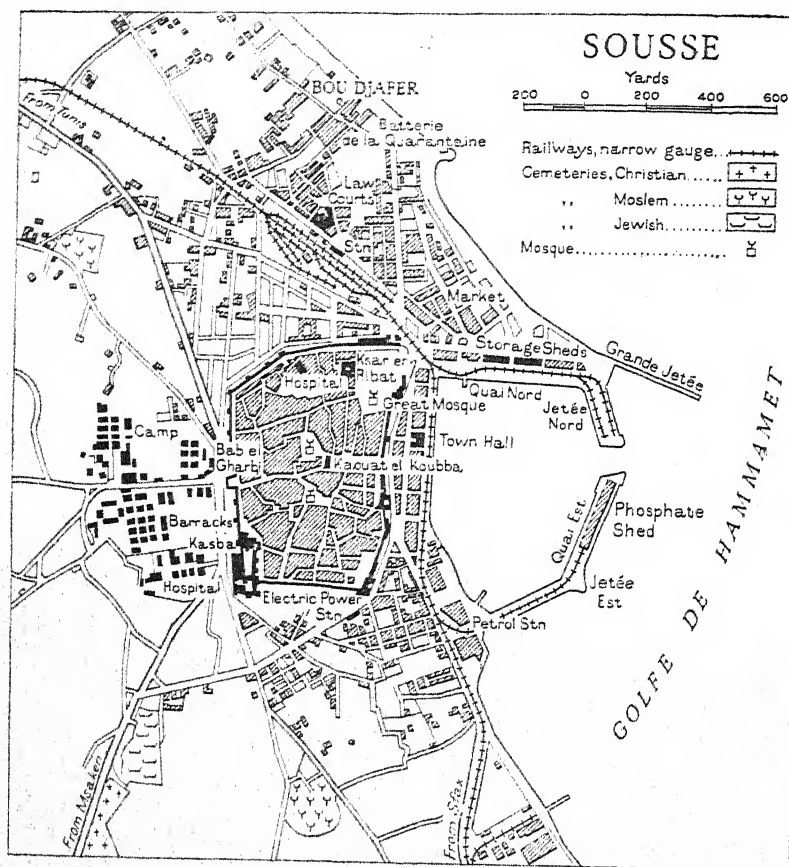


FIG. 49. Sousse (Susa)

The port serves as the outlet for the productive Sahel, the Kairouan district, and central Tunisia generally. The principal exports are phosphate, olive-oil, esparto grass, wheat, and barley. The imports consist mainly of general merchandise, coal, and building materials. Exports greatly exceed imports: in 1937, 587 vessels of 519,983 tons used the port, loading 447,581 tons and discharging only 46,922 tons.

Description of Port

The harbour is available to vessels drawing up to 20 feet and is formed by two masonry jetties, the *Jetée Nord* and the *Jetée Est*, the entrance between which faces east and is about 230 feet wide. From near the root of the *Jetée Nord* the *Grande Jetée* extends east-south-eastward for about 1,200 feet to protect the entrance from the swell from northward.

The depth in the entrance channel and in the centre of the harbour is 21 feet, and along the northern and eastern quays is 20 feet. The western side of the harbour is undredged except for a small channel leading to the petrol station in the south-western corner. The depths along the western and southern quays are from 6 to 13 feet.

The *Quai Nord*, the main commercial quay, is 1,675 feet long: vessels can berth either alongside or stern to (Photo. 157). From it a wharf, 120 feet long, projects southward: small craft can moor alongside and discharge or load.

The *Quai Est*, the western side of the *Jetée Est*, is leased to the *Compagnie des Phosphates*. It is used solely for the loading of phosphate, which is stored in a large shed fitted with an automatic hopper loading-device capable of loading about 300 tons per hour.

Facilities. The equipment before the present war included one 20-ton floating crane and three other cranes, a tug, a few lighters, and about fifty small open boats. There were two storage sheds on the *Quai Nord* with rail connexions.

A small stock of coal was usually maintained before the war: supplies of oil fuel were limited, but motor spirit, kerosene, diesel oil, and lubricating oil could be obtained from firms in the town. The electric power station on the southern side of the walled town supplied the surrounding district as far as Kairouan and Monastir.

Water is obtained from Bou Hafna near Pichon (63 miles west) and from Pavillier (55 miles south-west), and is stored in a reservoir. It is laid on to the principal streets and to the quays.

Communications

Rail: Narrow-gauge railways lead north to Tunis and south to Sfax. From Kalaa Srira on the Tunis line a line goes west to Sbeitla and Henchir Souatir, with a branch to Kairouan. From Msaken on the line to Sfax there is a branch to Djemmal, Moknine, and

Mahdia. Sousse station is in the European quarter, north-west of the Square Pichon.

Road: Main roads lead north to Tunis, west to Kairouan, and south along the coast to Monastir, Mahdia, and Sfax. A direct road to Sfax through el Djem leaves the Kairouan road at Msaken.

MONASTIR (Fig. 50; Photos. 66, 159). Lat. $35^{\circ} 46' N.$, long. $10^{\circ} 50' E.$ Population 10,572 (336 Europeans). Altitude 56 feet. Chief town of a caïdat. Electricity (3-phase, 220/380). Infirmary-dispensary. Hotel. Garages (2).

Monastir is at the north-eastern end of the Monastir peninsula about 14 miles east-south-east of Sousse and 29 miles north-west of Mahdia. The peninsula, formerly an island which has been joined to the mainland by sand accumulation, ends in rugged cliffs on its northern side, but slopes gently to the sea on the east apart from a short stretch of rocky and indented coast immediately south-east of the town. On the landward side there is a low plateau covered with olive-groves and extending to the Sebkhah Ain Sahline, a salt marsh, partially dry in summer, communicating with the sea by a shallow passage about $3\frac{1}{2}$ miles west of the town.

Monastir is almost entirely a native town, surrounded by a crenellated wall, with small square towers and a Kasba with a large round watch-tower or *nador* at the northern end of the eastern wall. There are several mosques, including two dating from the tenth century, two beautiful minarets, and a former residence of the Bey's *férik* (general), the Château el Kahlia. Many of the streets are narrow and winding. On the edge of the native town is a small European quarter.

On a shoal spit extending from the north-eastern end of the peninsula are three small islands: Djeziret Sidi el Ghedamsi (Egdamsi), the largest, is a tunny-fishing centre between April and June and has some ruined cisterns cut in the rock; Djeziret el Oustani (Ksira Lostaniah) or the Île de la Quarantaine has a number of artificial caves; the third and most northern is Djeziret el Achmam (Ksira te Achmam). About 13 miles east of Monastir are the Îles Kuriate, also a centre for tunny-fishing.

The Golfe de Monastir, which extends from the Monastir peninsula to within 4 miles of Ras Dimasse, affords the best anchorage between Cap Bon and Ras Kaboudia (20 miles south of Mahdia).

History

The ruins of the Carthaginian and Roman town of Ruspina are at Chekanes, 3 miles west of Monastir. Monastir itself derives its name from a Christian monastery built on the site of the present

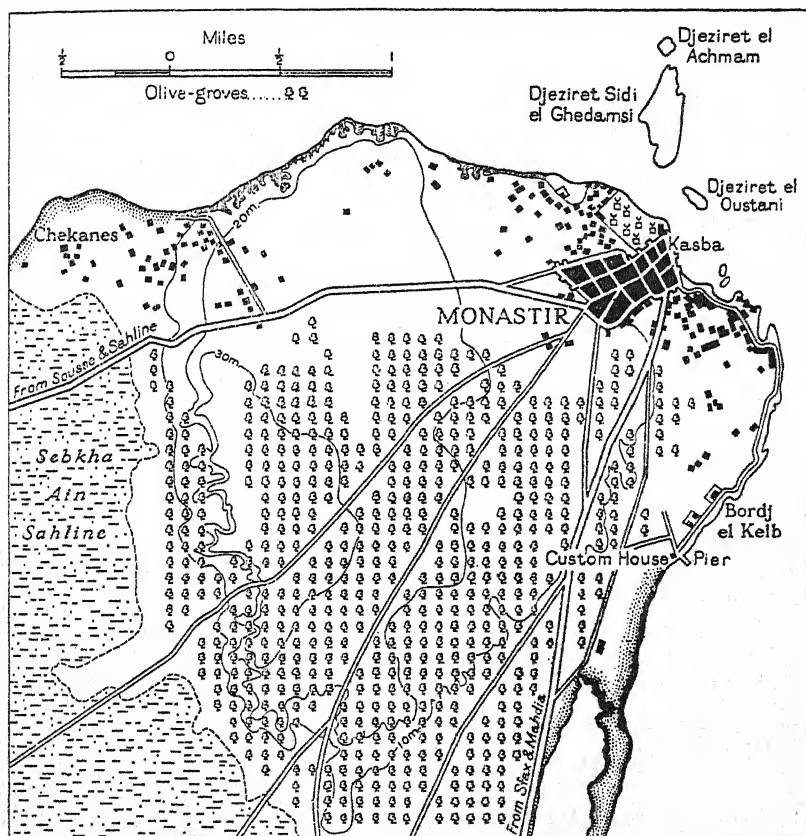


FIG. 50. *Monastir*

kasba. The monastery became a *ribat* or Moslem religious house during the ninth century. The walls and the Kasba were built by the Spanish.

At Lamta, 6 miles south-south-east of the town, are the ruins of Leptis Minor: they include traces of an amphitheatre, cemetery, and aqueduct, and of an old harbour and quays. The ruins of Thapsus,

where Julius Caesar defeated King Juba, one of Pompey's followers, in 46 B.C., are 10 miles farther south-east on the headland ending in Ras Dimasse.

Industry and Commerce

Monastir is surrounded by olive-groves and is the most northerly place in Tunisia where dates will ripen. The principal industries are the manufacture of olive-oil and soap, and tunny- and sponge-fishing. A market is held daily and a cattle market on Tuesdays. The trade consists almost entirely of exports, chiefly olive-oil. In 1937 a total of 31,600 tons was exported and only 455 tons discharged: 44 vessels with a total tonnage of 18,522 called at the port.

Description of Port

Landing is possible in small boats on the beach below the Kasba and the eastern walls of the town, but the best landing-point is at the pier by the custom house more than 1 mile south of the town and a short distance south of Bordj el Kelb. The pier has a depth of 6½ feet at its head. Steamships anchor about half a mile off shore due east of the custom house in 42 feet and with fairly good holding ground. This position is sheltered from north-westerly, easterly, and south-easterly winds.

Facilities. Except for fresh water, Monastir has few facilities.

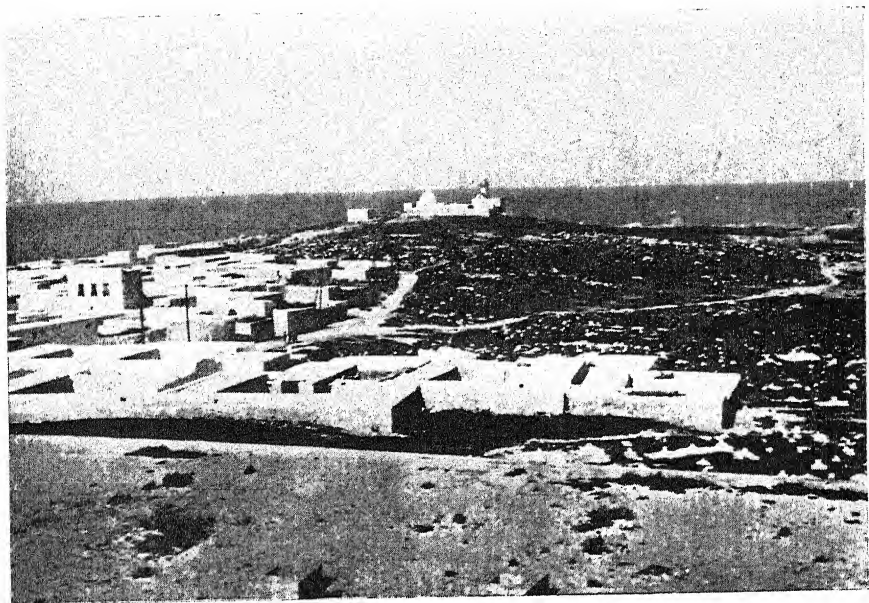
Communications

Rail: Monastir has no railway line. The nearest point on the Msaken-Mahdia branch of the narrow-gauge line from Sousse to Sfax is at Djemmal, 13 miles distant.

Road: Two secondary roads lead west and south to Sahline and Mnara respectively, both on the main coastal road from Sousse to Moknine, Mahdia, and Sfax.

MAHDIA (MAHEDIA) (Fig. 51). Lat. 35° 30' N., long. 11° 05' E. Population 8,488 (511 Europeans). Altitude 492 feet. Chief town of a caïdat. Brigade de gendarmerie. Electricity (3-phase, 220/380). Infirmary-dispensary. Hotel.

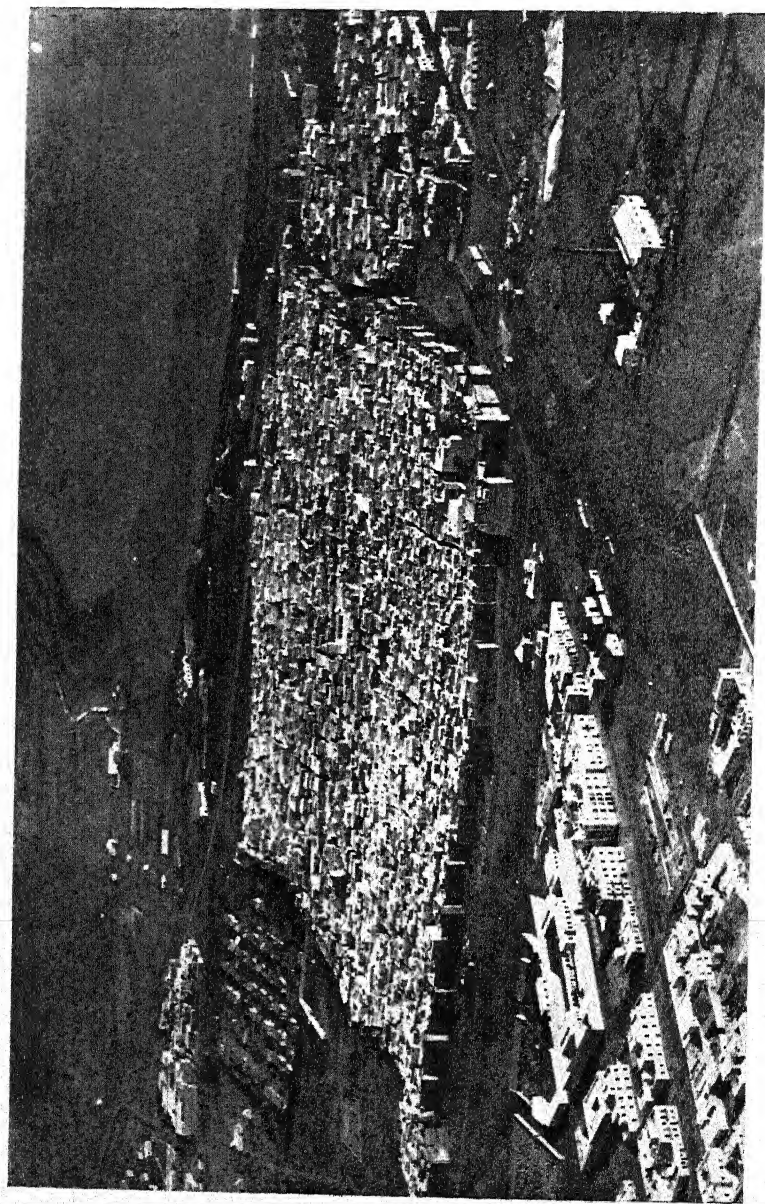
Mahdia is 29 and 43 miles south-east of Monastir and Sousse respectively and 66 miles north-north-east of Sfax. It stands on the narrow peninsula of Ras Mahdia, which projects eastward from the coast between the Golfe de Hammamet and the Golfe de Gabès.



159. *Monastir*



160. *Sfax: rural suburbs*



The peninsula, which is an island joined to the mainland by the accumulation of sand, is nearly 1 mile long and 550 yards wide, and is fringed with rocks and shoals extending eastward for about 700 yards: the koubba of Sidi Jabeur is on a hillock near the rocky extremity, which is known as Cap Afrique. The small harbour is on the southern side of the peninsula. The white buildings of the town are very conspicuous from the sea. They are dominated by the Kasba built by the Spanish in the sixteenth century: this building, which has now been restored, is at the eastern end of the present town in the centre of the peninsula and at its highest point. Below it are the lighthouse, a koubba, a cemetery, and the restored Roman cisterns. The native town, which has changed very little, lies to the west. Its main buildings are a castle, built in the centre to defend Mahdia on the landward side and now used as a prison, and the Great Mosque built by the Fatimites. The new, European, town has grown up to the south-west near the harbour; it includes barracks and the principal public buildings. On the landward side of Mahdia are two salt marshes, the small Sebkha el Andelette and the larger Sebkha Mta Sidi ben Rayada (Ghehada). The remains of a Carthaginian cemetery similar to that discovered at Carthage are about 2 miles west of the town.

History

Mahdia's remarkable geographical position on Ras Mahdia explains in part its history. It occupies the site of the old Carthaginian city of Zella, where Hannibal embarked after his exile from Carthage. Under the Romans it was a large and prosperous commercial centre, but after the battle of Thapsus, 8 miles to the north on Ras Dimasse, in 46 B.C. it was abandoned and not rebuilt until A.D. 912 by the first Fatimite Caliph, Obeid Allah el Mahdi, after whom it was named. During the tenth century it was fortified and became the port for Kairouan. Throughout medieval times it was an important trading centre, largely because of its great natural strength and its position in the central Mediterranean. It was commonly known as Africa and traded with Egypt, Syria, and Spain. Roger of Sicily captured Mahdia in 1147, but it was retaken by the Arabs under the Almohad leader Abd el Moumen thirteen years later. A combined French, English, and Genoese fleet under the Duc de Bourbon besieged the town for sixty days in 1390 without taking it: this was the first English expedition sent to north Africa. Later the corsair Dragut made Mahdia his headquarters. Charles V of Spain captured the

town in 1550, but had to evacuate it in 1574, when he destroyed its fortifications, which have never been rebuilt. Under the Turks and,

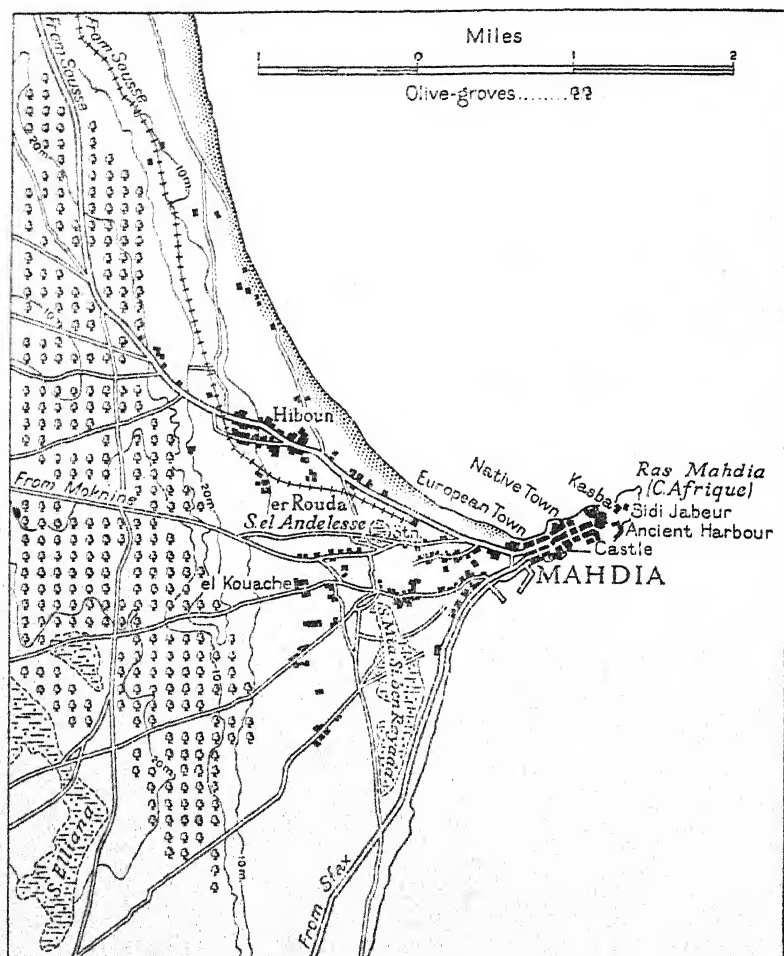


FIG. 51. Mahdia (Mahedia)

later, the Beys of Tunis Mahdia stagnated, but since the French occupation of the town in 1881 it has regained some of its former commercial importance. Some of the older houses and ramparts have been removed, and modern villas and the harbour have been built.

About 3 miles north-west of the lighthouse the wreck of an ancient

galley in about 130 feet of water was discovered and investigated between 1907 and 1913. The vessel was probably bound from Athens to Rome and was wrecked in the first century B.C. It was laden with works of art and building materials; the bronze statues and other treasures recovered are in the Musée Alaoui at le Bardo (Tunis).

Industry and Commerce

The principal industry is fishing, particularly for allaches, and is mainly in the hands of Italians, who form nearly half the total European population. The harbour is also used by fishermen from Empedocle in Sicily. Much of the catch goes to Italy and Spain. Olive-groves surround the town, which has a number of olive-oil factories. Mahdia has also become a popular sea-side resort in recent years. A market is held on Thursdays.

The trade of the port is slight and consists almost entirely of exports, mainly olive-oil. In 1937, 24,276 tons were exported and only 860 tons imported by 98 vessels of a total tonnage of 13,547.

Description of Port

The present harbour is on the southern side of the peninsula to the south-west of the new town. Two small breakwaters protect it. The entrance, facing south, is about 200 feet wide, but the depth at the quay is only 6 feet, so that the harbour can be used only by small fishing and other craft. Steamships anchor in the roadstead about 500 yards or more from the shore.

The well-preserved remains of the ancient harbour or *cothon*, a rectangular basin 480 feet long and 240 feet wide dug in solid rock, is on the south-eastern side of the old town. Its entrance is 42 feet wide and is connected to the sea by a canal about 60 feet wide, probably built by the Carthaginians.

Facilities. Mahdia offers no facilities, except for water-supply. Before the war it had three small oil tanks.

Communications

Rail: Mahdia is the terminus of a narrow-gauge line from Msaken on the line from Sousse to Sfax.

Road: The town stands on the coastal road connecting Sousse and Sfax. Of the secondary roads, the chief is that passing south and west of the Sebkha Mta Moknine to Moknine.

SFAX (Figs. 52, 53; Photos. 110, 160-164, 184, 190, 218). Lat. $34^{\circ} 44' N.$, long. $10^{\circ} 46' E.$ Population 43,333 (8,661 Europeans). Altitude 7 feet. Chief town of a region, a civil control, and a caïdat. Electricity (3-phase, 110/190 and 400/230). Hospitals (1 civil and military combined, 1 military). Meteorological station. Hotels (9). Garages (9).

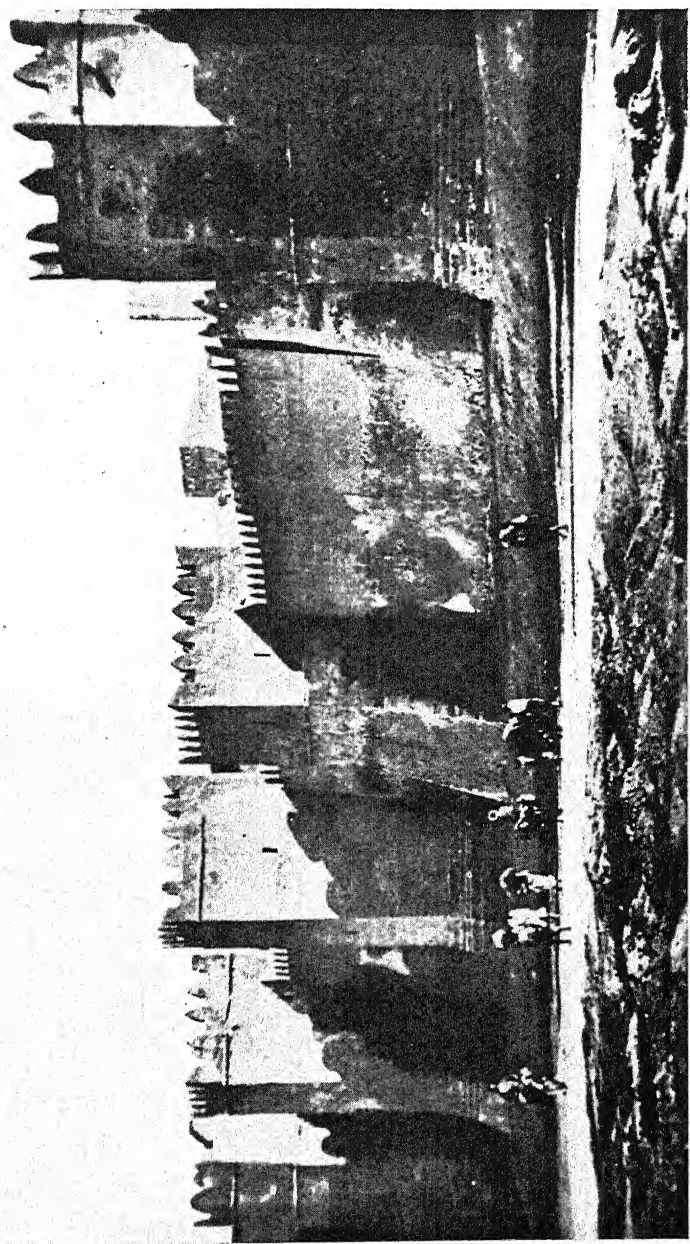
Sfax (Arabic *facous* or *asfaxis*, 'cucumbers') is the second town of Tunisia and, from the point of view of tonnage, the chief port. It stands on the east coast opposite the Îles Kerkenna, about midway between Ras Sidi Mansour and Ras Thyna, and is 82 miles south of Sousse, 66 miles south-south-west of Mahdia, and 86 miles north-west of Gabès by road. Behind the town a plain extends for about 9 miles to the foot of some hills between 300 and 500 feet high. The cultivated Sahel, mostly planted with olives, extends inland from Sfax. The town, which consists of an old native town with modern European quarters, is conspicuous from the sea because of its white buildings dominated by the tall minaret of the Great Mosque and the towers of the Roman Catholic Church, and of some large sheds and an overhead transporter in the port area.

Sfax roadstead affords anchorage completely sheltered from all winds and with good holding-ground, although when a fresh breeze is blowing it is advisable to veer out a fair length of chain.

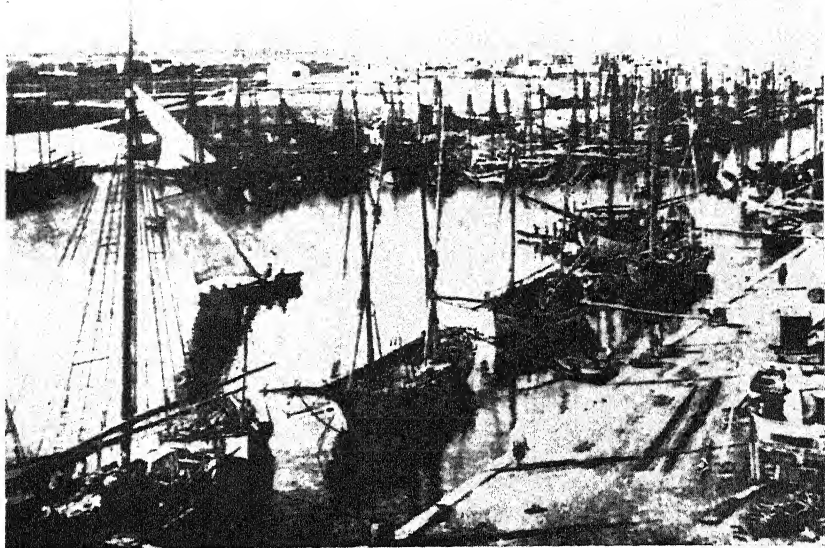
The spring tidal range in the port of Sfax is $5\frac{1}{4}$ feet, an unusually large range for the Mediterranean.

History

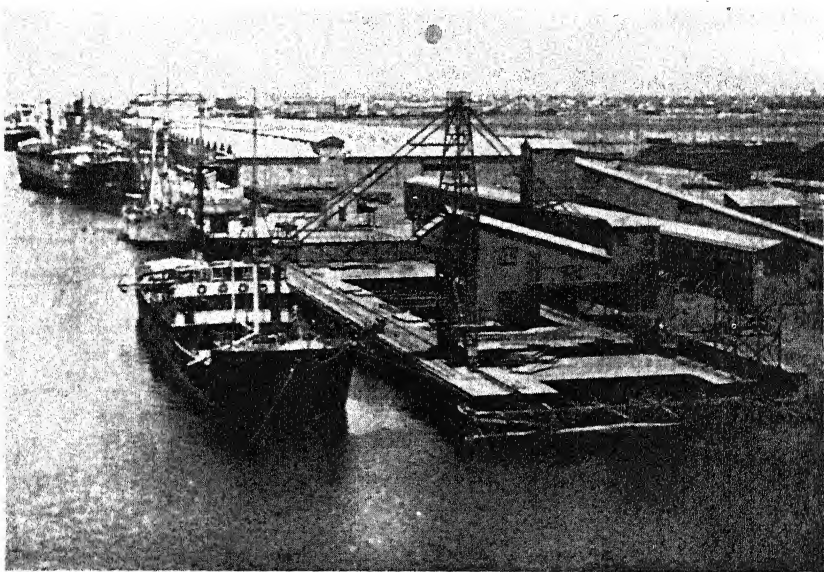
Sfax was first a Carthaginian settlement and then the Roman town of Taparura; some of its building materials were used later in the construction of the Kasba and mosques in the present town, and there are various ruins north of the town. In the ninth and tenth centuries Sfax prospered, particularly under the Aghlabites, and was famous for the manufacture of olive-oil and cloth and as a fishing-centre. During the Hilalian invasion the district formed a small independent state under Arab protection from 1095 to 1099. Sfax was taken by the Normans from Sicily under Roger in 1148, but was recaptured by the Almohad leader Abd el Moumen in 1159. The Spanish occupied it for a short period in the sixteenth century. Sfax has been bombarded on five occasions, the last being in July 1881 when the French under Admiral Garnault overcame all resistance to their occupation in two days; the town was then pillaged by



162. Sfax: the walls



163. *Sfax: the small basin*



164. *Sfax: the Quai des Phosphates*

the troops and later made to pay an indemnity equivalent to about a quarter of a million pounds.

At the time of the French occupation the only anchorage was 2 miles from the shore, but in 1884 a wooden jetty about 165 feet long for the loading of esparto grass was built, a short distance south of the present railway station. It was linked to the sea by a channel 1,860 yards long. The present harbour was constructed mainly between 1895 and 1897 by the Compagnie des Ports de Tunis, Sousse, et Sfax, which still manages the port on behalf of the Tunisian Government: during building operations various Roman and later ruins were discovered. Further extensions to the harbour were undertaken in 1907 and 1921, and in recent years a considerable area of land in the neighbourhood of the port has been reclaimed and developed.

Description of Town

The native town or Medina is some distance north-west of the port, from which it is separated by the European and business quarter. It covers an area some 660 by 430 yards and consists of four quarters, el Ksar, el Mahdia, er Rekka, and el Hissar. The whole area is surrounded by walls with square and round towers, parts dating from the ninth century (Photo. 162): three of the gates are still used, the Bab Diwan, the main gate, on the south-east giving access to the European town, the Bab Djebli on the north-west, and the Bab Djedid below the Kasba, which occupies the south-western corner of the town. Until 1832 no Europeans were allowed in the native town, which still shows little change: its narrow and dirty streets and crowded souks make Sfax the most interesting town in Tunisia after Tunis and Kairouan. Many of the mosques, zaouias, and private houses are good examples of the native art of the seventeenth and eighteenth centuries, though some are considerably older; the Great Mosque, with its lofty minaret, for example, was built in 849 and rebuilt in 981, with modifications during the eighteenth century.

The European town really consists of two parts, the original business area immediately south-east of the Bab Diwan, and the more recent quarter built on three sides of this area, partly on land reclaimed from the sea, and planned on a rectilinear pattern with wide and modern streets, mostly under the direction of the architect Guy. These quarters include nearly all the public buildings such as the Town Hall, where is a small museum containing Roman antiquities from Thyna (the ancient Thaenae), about $7\frac{1}{2}$ miles to the south on the

Gabès road. The residential area has also spread north of the native town into the suburb of Moulinville, which consists mainly of French villas, and west to Picville, the home of many of the Maltese, Greeks, and lower-class Italians.

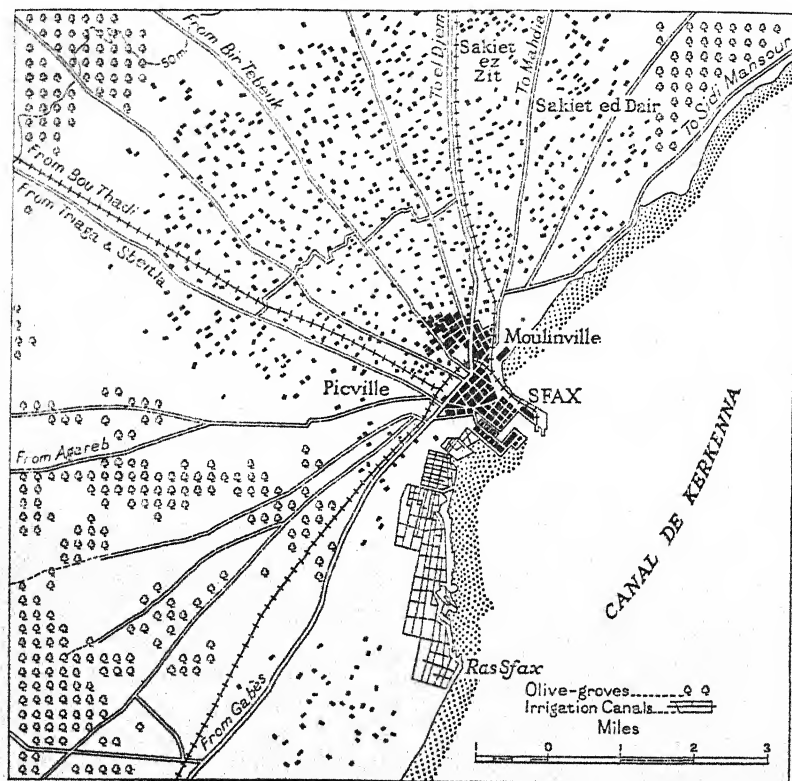


FIG. 52. The geographical setting of Sfax

The great Regional Hospital, a combined civil and military hospital serving central and southern Tunisia, is three-quarters of a mile north-west of the native town. South-west of it beyond the suburb of Picville are some public gardens, including a Jardin d'Essai, in which are two large reservoirs. There are also more than 500 bottle-shaped reservoirs called *nasrias*, gifts to the town by wealthy inhabitants, in an area due north of the Bab Djebli. To the north-east of the old town are military barracks, beyond which is a large open space, 660 by 330 yards, known as the polo ground and before the present war used as an emergency landing-ground.

Beyond the ring of immediate suburbs there extends a large area covered by well-kept gardens with fruit-trees and vines, each with a fairly large house or *bordj* (Photo. 160). Still farther from the centre of Sfax are the olive-groves which extend continuously for many miles inland. Those nearest to the town were established early in the nineteenth century and most of them are badly set out and comparatively unproductive: but beyond them are the plantations established since 1892 on the 'terres sialines' (as described on pp. 287-288), with straight rows of carefully tended trees (Photos. 177, 179). In contrast to the Sahel of Sousse, the groves are continuous for many miles, with no clearings, villages, or even houses.

The population has grown steadily from about 15,000 in 1881 to 26,625 in 1921 and 43,333 in 1936: with the adjoining cheikats of Sakiet ez Zit, Merkez Kamoun, Merkez Damak, Merkez ben Halima, and Sakiet ed Dair the population is about 100,000. At the last census the urban population included 5,224 Frenchmen, 2,610 Italians, 827 other Europeans (chiefly Maltese and Greeks), and 3,466 Jews.

Industry and Commerce

About 7 million olive-trees grow in the district surrounding Sfax, and one of the main industries in the town is the manufacture of olive-oil and of associated industrial oils, vaseline, glycerine, and soap. Altogether there are about 400 presses, many owned by natives: the most modern are those belonging to the Société générale des Huileries du Sahel Tunisien and the Société de l'Huilerie Franco-Tunisienne. Fishing is carried out extensively on the shallow shelf off the coast; altogether there are about 1,000 fisheries in the district (including the Îles Kerkenna), each surrounded by wattle fences, producing between 800 and 1,000 tons of fish per annum (Photo. 189). In addition between 125 and 130 tons of sponges are landed during the season (1 January to 1 October) by about 1,300 vessels (600 Italian, 50 Greek, and 650 native), together with 250 to 300 tons of octopus, exported mainly to Greece. Several markets are held daily, mostly in the native town.

Sfax was formerly the starting-point of a trans-Saharan caravan route, but its hinterland now extends southward only as far as the phosphate-producing region around Gafsa, to which it is linked by railway. The principal exports are phosphate (1,205,000 tons per annum in the period 1934-1938), olive-oil (averaging 20,000 tons, but sometimes as much as 40,000 tons or more), salt (43,000 tons),

esparto grass (30,000 tons), with smaller quantities of cereals, dates, almonds, wool, sponges, dried octopus, and hides. Imports consist of coal, petroleum, timber and other building materials, iron, hardware, textiles, sugar, flour, and other foodstuffs. Exports far exceed imports, and in 1937 were greater than those of Tunis and la Goulette combined, accounting for 1,490,225 tons of the port's total trade of 1,639,877 tons. In the same year Sfax was used by 1,665 vessels with a total tonnage of 930,504, and 801 passengers landed or embarked.

Description of Port

The harbour consists mainly of an L-shaped basin, the Bassin du Port, dredged to a depth of 21 feet and surrounded by quays connected with the railway. The entrance faces south-east and communicates with the sea by a channel, 2,275 yards long and dredged to a depth of 21 feet. This channel is marked out by fishing-stakes and is 72 feet wide at the bottom, and wider at its seaward end.

In the middle of the basin are some warping-buoys used for turning ships in the harbour and for hauling off the quays. The north-western quay is the Quai du Commerce and the north-eastern quay the Quai des Phosphates. Near the entrance the Quai des Alfas extends in a south-south-westerly direction for 425 feet from the extension of the Quai des Phosphates: it has berths for two vessels, one on either side, in depths of 24 feet, and is used exclusively for the loading of esparto grass (Photo. 184). Close south-eastward of this quay is a petrol quay, 100 feet long and with from 13 to 15 feet of water alongside.

The Quai du Commerce, on the harbour side of the street known as the Quai Mougeot, is 1,200 feet long with a depth alongside of 21 feet. It is used for the handling of salt, grain, and general cargo, and is served by rail and road. The Quai des Phosphates is 1,450 feet long with a depth alongside of 21 feet and with rail and road connexions. Most of it is reserved for the Compagnie des Phosphates et du Chemin de fer de Gafsa, which owns large storage sheds and mechanical appliances, but the south-eastern end is used by the Société des Phosphates Tunisiens and the Compagnie Tunisienne des Phosphates du Djebel Mdilla (Photo. 164).

At the south-western end of the Quai du Commerce is the entrance to a small basin which has depths of from 10 to 15 feet and is used by fishing-vessels (Photos. 163, 190). The basin is surrounded by quays and on its western side is the sponge market.

Navigation in the port is not difficult, though the entrance channel

is very narrow and is sometimes impassable in a strong cross-wind. Pilotage is essential for all vessels of 100 tons or more entering the port.

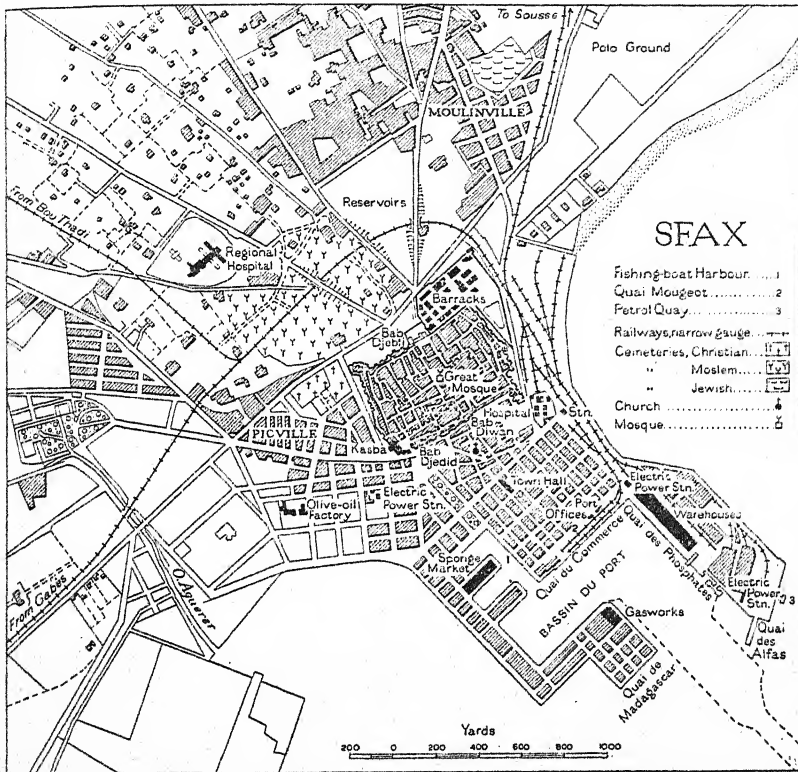


FIG. 53. *Sfax*

Facilities. The equipment of the port before the present war included one 20-ton crane on rails on the Quai du Commerce, one 20-ton floating crane, about five other cranes, and six elevators (3 large and 3 small moveable) on the Quai des Phosphates capable of loading 940 tons per hour. The harbour craft consisted of a few tugs and lighters. There were no docking facilities or ship-repairing and engineering works. There were large warehouses behind both the principal quays, those on the Quai des Phosphates being for phosphate only.

Small stocks of Welsh coal were usually stored on the Quai du Commerce; coal could be taken from the quay or sent alongside

by barges. Small stocks of oil were carried by two commercial firms in the port. The electric power station was about a quarter of a mile south-west of the Kasba: it had two subsidiary stations, one at the north-western and the other at the south-eastern end of the Quai des Phosphates. Coal gas was also produced at the main power station, which was also responsible for the town's water-supply. There was a gasworks at the corner of the quay on the opposite side of the harbour from the Quai du Commerce.

Good drinking-water is available at all the main quays: the principal supply comes by pipe-line from Sbeitla, 105 miles inland.

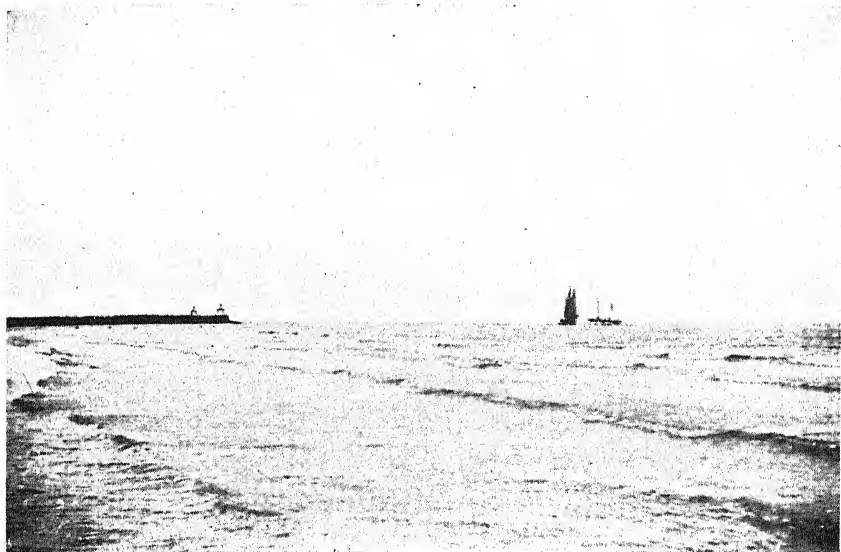
Communications

Rail: Narrow-gauge lines lead north to el Djem, Sousse, and Tunis and south to Maharès, Maknassy, and Gafsa. The latter line branches at Graiba to Gabès. A narrow-gauge line also goes in a north-westerly direction from Sfax to the Djebel Krechem district (south-west of Bou Thadi) and will eventually be extended to Sbeitla. The station is on the eastern side of the European and business quarter at the north-eastern end of the Avenue Jules Gau, immediately adjacent to the sea.

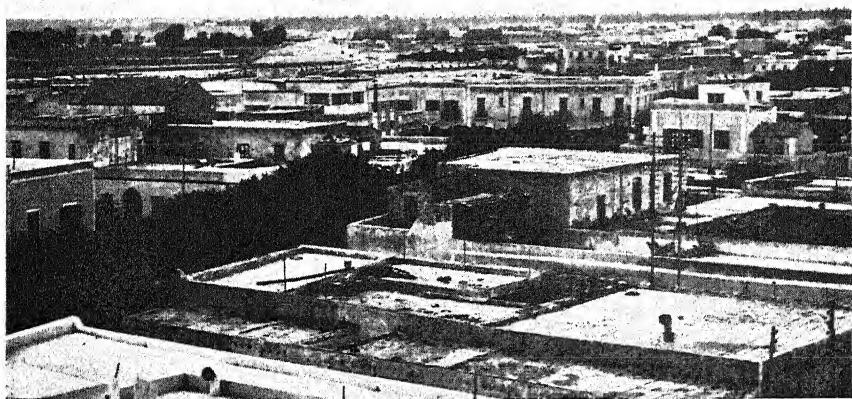
Road: Sfax is the centre of a network of good roads leading through the olive-producing districts of the Sahel. The chief roads lead north to Sousse (one along the coast through Mahdia and the other directly north through el Djem), north-north-west to Bir Tebeuk, north-west to Triaga and Sbeitla, west to Agareb, and south-west to Maharès and Gabès. The only good transverse route connecting these roads is that from la Hencha on the el Djem road to the Sbeitla road near Triaga.

GABÈS (QABES) (Fig. 54; Photos. 39, 165-168). Lat. $33^{\circ} 51' N.$, long. $10^{\circ} 7' E.$ Population 18,611 (1,757 Europeans). Altitude 36 feet. Chief town of a civil control. Electricity (continuous 110/220). Brigade de gendarmerie. Hospital (military). Infirmary-dispensary. Meteorological station. Hotels (5). Garages (4).

Gabès is in the centre of the shore of the Golfe de Gabès, on the southern side of a large oasis, about 27 miles south of la Skhirra and 36 miles west of the western shore of the Île de Djerba. It is the commercial centre of a number of settlements, the chief of which are on the southern side of the Oued Gabès. The coast near the oasis is low and flat with extensive sandy beaches, and is fringed by a sandbank, with depths over it of less than 18 feet, to a distance of



165. *Gabès: the harbour entrance*



166. *Gabès*



167. *Gabès: the oued*



168. *Gabès: Djara el Kbira market*

nearly half a mile in places. The harbour has been dredged at the mouth of the river, which has its source in some strong springs at Ras el Oued, about 6 miles inland. Plantations extend along the north bank of the river for about 4 miles and to a depth of up to 1 mile. Altogether there are 200,000 palms producing dates of only poor quality. Other crops, often grown in the shade of the palms, include olives, apricots, vines, pomegranates, and tobacco.

The modern French village is the most easterly of the settlements comprising the Gabès oasis. Here are the principal public buildings, including the Town Hall, the post office, and the railway station. To the south are two military camps and barracks, the Camp Mangin and the Camp Brugirard. The Jewish quarter with more than 2,500 inhabitants is to the west, Gabès being one of the few places in Tunisia where Jews live apart. Also to the west is the large native village of Djara el Kbira (Grande Djara) bounded by the Oued Gabès. The village of Menzel is immediately to the south, with the much smaller settlement of Sidi Boulbaba 1 mile farther on in the same direction. On the opposite bank of the river from Djara el Kbira is Djara es Srhira (Petite Djara), through which passes the Oued el Menia: some of its streets are covered. Djara ech Chergui is farther down the Oued el Menia, which enters the sea about three-quarters of a mile north of the Oued Gabès. Scattered among the trees of the oasis are a number of other settlements, including Sidi Merouane, Semassa, Ouled el Hadj, Chenini de Gabès, and el Maita. Near the latter are two dams holding up water to form small lakes; one of the dams is ancient and in a bad state of repair, the other was built in 1895. To the north of the Gabès oasis, between the Oueds Gabès and el Melah, are four more oases, Bou Chemma, Rhennouch, Metouia, and Oudref. To the south the chief oases are Mteurch and Teboulbou.

History

Gabès occupies the site of the Roman colony of Tacapae, of which only a few ruins remain: many of the native houses in the oasis are built of materials from Tacapae. The European town has been created since the French occupation. The villages, notably Djara el Kbira and Menzel, opposed the French landings in 1881 and submitted only after a naval bombardment.

Industry and Commerce

The shallow sandy bottom of the Golfe de Gabès is rich in fish, shellfish, and sponges, and fishing is the principal industry. Most

of the population of the neighbouring villages are farmers. Markets are held daily in most of the settlements in the oasis, the largest being those held on Sundays, Mondays, and Tuesdays at Djara el Kbira (Photo. 168).

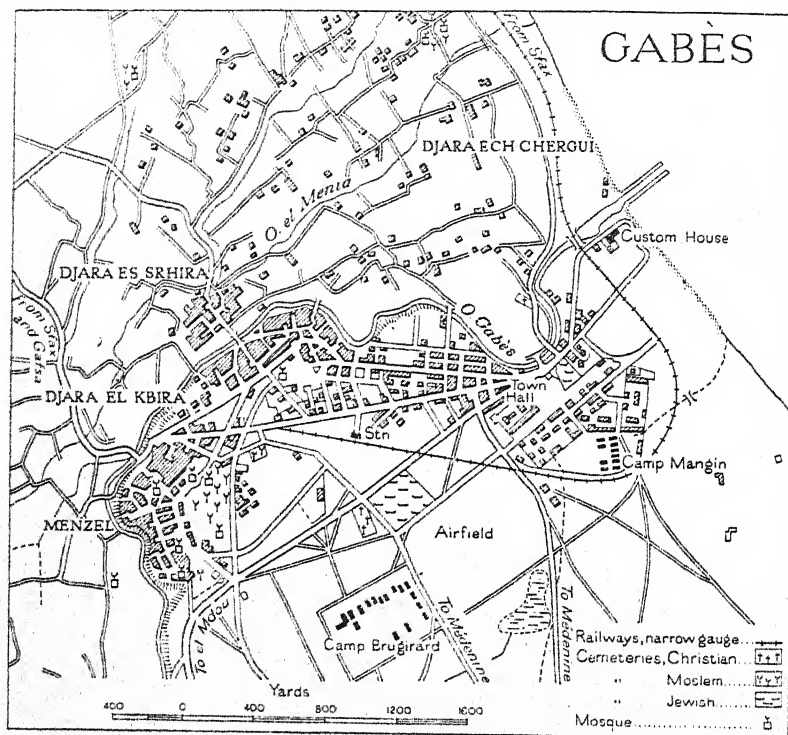


FIG. 54. *Gabès (Qabès)*

The exports are dates and other fruits, barley, henna, sheep, hides, and esparto grass. Imports include cotton goods, provisions, wines, building materials, timber, and hardware, and greatly exceed the exports. In 1937, 309 vessels of 41,159 tons visited Gabès, discharging 16,244 tons of merchandise and loading only 1,945 tons.

Description of Port

The harbour is protected by two parallel rubble breakwaters, one on either side of the entrance to the Oued Gabès (Photo. 165). The entrance channel is about 85 feet wide. In 1929 the harbour was dredged to a depth of 8 feet, but in 1938 the depth at the entrance

was only $1\frac{1}{4}$ feet. Within the harbour there is a small boat basin, dredged to a depth of 4 feet. At low water the landing-steps at the custom house (on the south bank of the estuary) can be approached only in small boats.

Vessels anchor within 1 mile of the shore, and loading and discharging is carried out by lighters. In summer, with easterly winds, communication with the shore may be difficult owing to the surf at the harbour entrance.

Facilities. There were three small oil tanks, but few other facilities before the present war. Water is obtained from the springs at Ras el Oued.

Communications

Rail: Gabès is the terminus of the narrow-gauge line along the east coast of Tunisia from Tunis through Sousse and Sfax. This line is joined at Graiba by the line from Tozeur and Gafsa. The Decauville track from Gabès towards the Mareth defences was dismantled in 1940 (p. 394).

Road: Main roads lead north along the coast to Sfax, branching near Metouia to Gafsa, and south to Médenine and the road network of southern Tunisia. There are also roads leading inland to el Hamma and Kebili and to el Mdou and Matmata.

HOUMT SOUK (HUMT SUK, DJERBA) (Fig. 16; Photos. 113, 169, 171, 172). Lat. $33^{\circ} 53' N.$, long. $10^{\circ} 52' E.$ Population *c.* 4,650 (*c.* 560 Europeans). Altitude 25 feet. Chief town of a civil control and a caïdat. Brigade de gendarmerie. Meteorological station. Hotels (3). Garages (8).

Houmt Souk (abbreviation of Houmet es Souk, 'market quarter') is a small town and port on the northern side of the Île de Djerba, of which it is the administrative centre. The whole of the northern shore of the island from Bordj Djillidj to Ras Rmel (7 miles west and 4 miles east respectively of Houmt Souk) is fronted by a shallow bank of mud and weed extending off shore for about 3 miles in places. There is good anchorage, with excellent holding ground, off the edge of this bank to the north-north-west of the village: vessels anchor according to their draught, and steamships are sometimes about 4 miles off shore.

The main feature of the town is an ancient fortress on the shore, the Bordj el Kebir, which dates from about 1500 (Photo. 171). The Spanish surrounded it with bastions, and the corsair Dragut further

strengthened it in 1567. Other buildings include several mosques, which, like those elsewhere in the island, are small, belonging to the Wahabite (Kharijite) rite (Photo. 112), a Greek church, and the medersa and zaouia of Sidi Brahim el Djamni, founded in 1674 and completed in the early part of the eighteenth century by the Bey Mourad ben Ali.

History

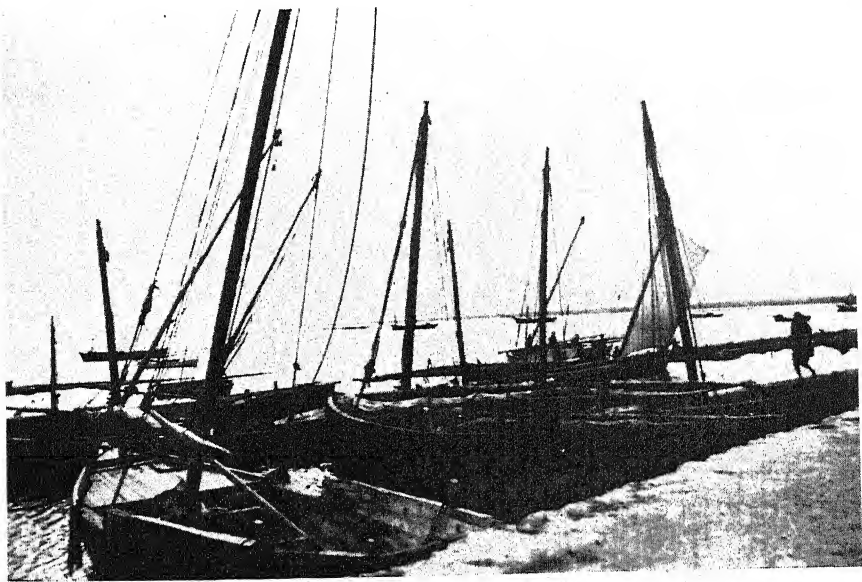
The history of Houmt Souk is inseparable from that of the Île de Djerba, known to the Greeks and Romans as the island of the Lotophagi or Lotus-eaters. On the island were several towns such as Meninx in the south-east near el Kantara, Tipasa in the south-west, and Girba in the north near Houmt Souk. After the destruction of Jerusalem in the first century A.D. many Jews settled on Djerba: to-day there are more than 4,000 Jews in the island, mainly in the towns of Hara Kebira and Hara Seghira. In medieval times the possession of the island was disputed by the Normans of Sicily, the Spanish, and the Turks. In 1512 the island became the headquarters of the pirate Aroudj and of his brother Khair ed Din (Barbarossa). After 1535 the Spanish held Djerba for twenty-five years, but in 1560 their fleet was destroyed off the island by Piali, a Turkish admiral, and Dragut, and their garrison at Houmt Souk exterminated. A pyramid, 10 feet broad at the base and 20 feet high, was built of their skulls and other bones. The pyramid, known as the Bordj er Rous or tower of skulls, was pulled down in 1848, and the remains buried in the Roman Catholic cemetery at Houmt Souk. The site of the pyramid is now indicated by a small mound.

Industry and Commerce

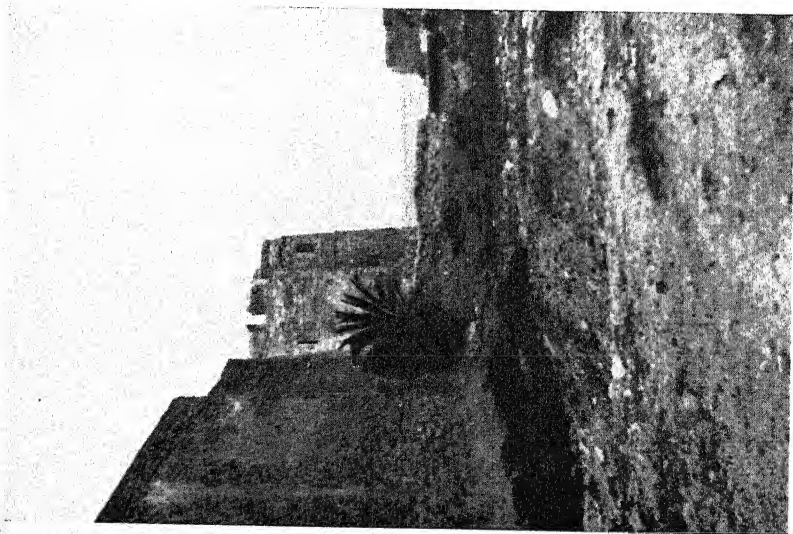
Houmt Souk has a number of souks, the main markets being held on Mondays and Thursdays. It is a considerable fishing-centre, especially for mullet, sole, tunny, and sponges: the last are sold in the markets between November and March. Olives, dates, figs, and other fruits are grown extensively throughout the island, and there are various industries, including the making of olive-oil, pottery, and woollen cloths interwoven with silk. Coasting steamships call regularly. In 1937, 445 vessels of 112,595 tons used the port, bringing 12,311 tons of general merchandise and loading 3,005 tons. Other fishing-centres on the Île de Djerba include Adjim (p. 230; Photo. 170) and el Kantara on the south coast and Aghir on the east coast.



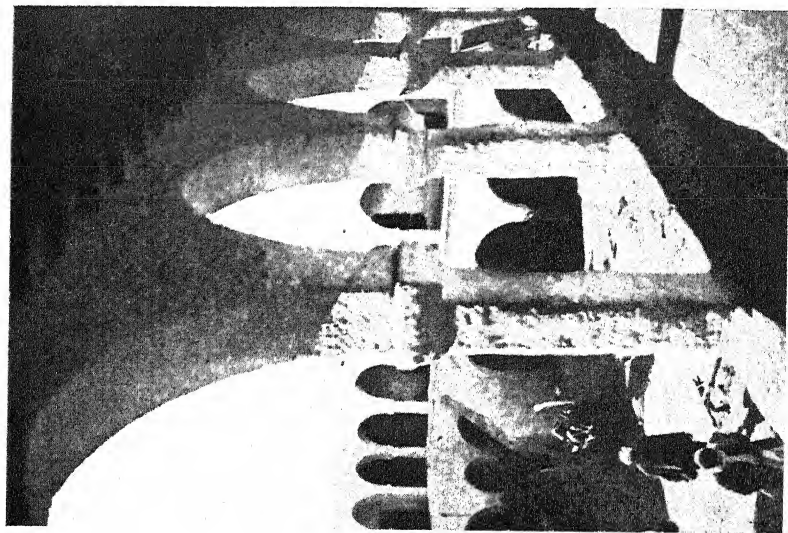
169. *Houmt Souk, Île de Djerba*



170. *Fishing-craft, Adjim, Île de Djerba*



171. Houtmt Souk: the Spanish fort



172. Houtmt Souk: courtyard

Description of Port

The 'port' of Houmt Souk consists of a small basin, dredged to a depth of 7 feet, which is linked to the sea by means of a buoyed channel, 82 feet wide and dredged to 5 feet, across the flats on the northern side of the island. The channel is available only with local knowledge and by day: it is entered south of the light-buoy north-east of Bordj Djillidj.

Facilities. There are no facilities. Water-supply on the island is difficult. There are no streams or springs, but nearly 4,000 wells and over 2,200 reservoirs. An artesian boring at Houmt Souk, over 800 feet deep, gives a flow of about 240 gallons per minute of rather saline water.

Communications

Rail: There are no railways on the Île de Djerba.

Road: The two main roads from Houmt Souk go south-west and south-east to Adjim and el Kantara respectively, whence there are ferry services to the mainland (Photo. 69). Secondary roads lead west to Bordj Djillidj and east to Midoun.

ZARZIS (Fig. 17, Photo. 106). Lat. $33^{\circ} 30' N.$, long. $11^{\circ} 07' E.$
Population 7,641 (157 Europeans). Altitude 33 feet. Bureau des Affaires indigènes. Hotel.

Zarzis is a large oasis in southern Tunisia, the village and port of the same name being about 10 miles south-east of Ras Marmour and 34 miles north-west of Ras Adjir on the Libyan boundary. It is about 86 miles from Gabès by road through Médenine. North of the village the coast is backed by a line of low hills ending in cliffs and fringed with rocks, beyond which a shallow bank extends off shore for about 1 mile. The coast to the south is low and backed by extensive lagoons, the largest being the Bahiret el Biban. Inland the surface is undulating and generally less than 100 feet above sea-level: there are several salt marshes or sebkhas, notably the Sebkret el Melah, with an area of about 50 square miles.

Anchorage, sheltered from southerly and easterly winds, is available off Zarzis to vessels with local knowledge: vessels anchor east-south-eastward of the custom house, as close inshore as their draught permits.

The modern village of Zarzis is an administrative centre with a small fort and a population of only a few hundreds, surrounded by

a number of other settlements and extensive plantations with thousands of date-palms and olives. The chief villages include Ksar Zaouia, Souahel, Ben Fetail, Sannrhoul, and Sidi Chemmakh, all to the north or north-west of Zarzis, and Ksar Mouansa and Sidi bou Teffaha to the south-west.

History

Zarzis occupies the site of the Roman port of Gergis, but the present village has been established since the French occupation of southern Tunisia. About 4 miles to the west, at Ziane, are the ruins of the forum and three temples of the ancient town of Zitha.

Industry and Commerce

The Accara, the chief tribe in the oasis, are hard-working farmers who are repeating on a small scale the achievements of the Sahel of Sfax. Abundant, though slightly brackish, water is obtained from artesian wells and is stored in large tanks. The most productive boring, made in 1926, reaches 625 feet and gives 660 gallons per minute.

During the War of 1914-1918 salts were obtained from the Sebket el Melah for the production of bromine, potassium chloride, and magnesium chloride (p. 328). The main factory was at Ain es Serab, on the northern side of the sebkha, about 6 miles from Zarzis, to which it was connected by a light railway. The track remains, though the factory closed in 1918.

Zarzis serves only a limited area, and is used mainly by sponge fishermen. In 1937, 472 ships of 38,002 tons called: imports totalled 8,093 tons and exports 1,995 tons.

Description of Port

The 'port' consists of a landing-place near the custom house (about half a mile south of the village) on a drying reef which extends south-south-eastward from the shore for about 1,500 feet. The outer end of this reef is marked by a red masonry beacon with a spherical top-mark. Squalls often make landing dangerous. About 500 yards south of the custom house is a pier extending south-eastward for about 1,000 feet. The port is very liable to silting.

Facilities. There are no facilities at Zarzis. Water is abundant for agricultural purposes.

Communications

Rail: Apart from the light railway to Ain es Serab, the nearest railway is at Gabès.

Road: The main road leads inland to Médenine with a branch road about 30 miles from Zarzis to Ben Gardane. There is also a direct motor track to Ben Gardane along the western shore of the Bahiret el Biban. Two roads lead north from Zarzis, one following the coast to Sannrhoul and the other passing through the oasis to Sidi Chemmakh and el Kantara Continent and thence to the Île de Djerba.

CHAPTER XII

AGRICULTURE AND FORESTRY

AGRICULTURE

TUNISIA is pre-eminently an agricultural country, despite the value and variety of its mineral resources, and its commercial prosperity depends very largely upon the success or failure of its crops. About 90 per cent. of the native population is engaged in the cultivation of the land, and a smaller, though still considerable, proportion of the Europeans is similarly employed. Where relief, soil, and climate are favourable, cultivation is intensive, and good use is made of the land even where conditions appear to be unsuitable: in the Sahel of eastern Tunisia, for instance, olives are grown extensively in spite of the low rainfall, owing to the proximity of the sea and the consequent heavy falls of dew. Much of the country is, however, agriculturally unproductive, especially the desert areas of the south, and even ploughed land is left fallow every other year, partly because of the poverty of the soil but mainly owing to lack of rain. In 1936 it was estimated that about 35,000 square miles (22,500,000 acres or 9,000,000 hectares) could be classified as 'productive', and about 13,500 square miles (8,650,000 acres or 3,500,000 hectares) as 'unproductive'. The productive land was made up as follows:

	<i>Hectares</i>	<i>Percentage of total productive land</i>
Arable land	2,934,000	32.6
Meadow and grassland	100,000	1.1
Orchards and vineyards	400,000	4.4
Woods and forests	1,016,000	11.3
Common land and uncultivated	4,550,000	50.6

Fig. 55 indicates the main agricultural use of the land in Tunisia. Agricultural statistics are given in Appendix H.

There are two main types of farming in the country, that of the European settlers, the *colons*, and that of the natives. The settlers, particularly the French, own large-scale mechanized units, employ cheap native labour, and produce wine and cereals, especially soft wheat and barley, for export as well as for local consumption. The standard of farming on many of these holdings is fairly high. Crop rotation and dry-farming methods are practised, and the land is left fallow for one year in two, much of the preliminary work being done

during the winter. The soil is kept in a pulverized condition by means of a 'cultivator' and is heavily fertilized, particularly with superphosphate: chemical manures must, however, be handled with great care, especially in fairly dry districts, since they need moisture for their decomposition. Leguminous crops are sown as frequently as possible. Much attention is paid by European farmers to the selection of seed, and mechanization has been introduced on many farms, especially where there are difficulties of labour supply.

The native holdings, in contrast, are generally small and confined to the hilly and less fertile land: they are cultivated in an extremely primitive and inefficient fashion with very poor implements (Photo. 174). In some districts, however, the natives are beginning to copy the methods of the colonists and to practise crop rotation, though the land is nearly always left alone when fallow. Little weeding is done while the crops are growing. There is some justification for the careless methods of the native farmer in parts of the steppes where good harvests are obtained only once in three or four years, but elsewhere the results are very meagre and yields are exceptionally low compared with those obtained on even poorly managed European farms.

Moslem law relating to land is described on p. 160, and the modifications in the system of land tenure introduced by the French and the adoption of land registration on pp. 184-186. The extent to which land has been made available to European settlers and the progress of agricultural colonization are discussed on pp. 284-288.

Native, and sometimes European, landlords in Tunisia may have their property worked for them by means of contracts with native labourers. There are at least three common forms of contract—the *khammesat*, the *mgarsa*, and the *mougakate*. The *khammes* is a share-cropper who contributes nothing except his labour, for which he receives one-fifth, or sometimes a quarter, of the crop. He is usually very poor and often has to borrow money from the landlord, to whom he may become indebted for the rest of his life. His position is, therefore, little better than that of a serf. This system is gradually disappearing, its place being taken by that of hiring labourers by the day or season.

The *mgarsa* is an arrangement followed in some olive-growing districts, particularly around Sfax, that has proved satisfactory to both landlord and tenant. The tenant, known as the *mgarsi*, leases a certain plot and undertakes to clear it and plant it with olives. He provides the tools and the young trees and supplies himself with food by growing grain beneath the trees: this cultivation is valuable because

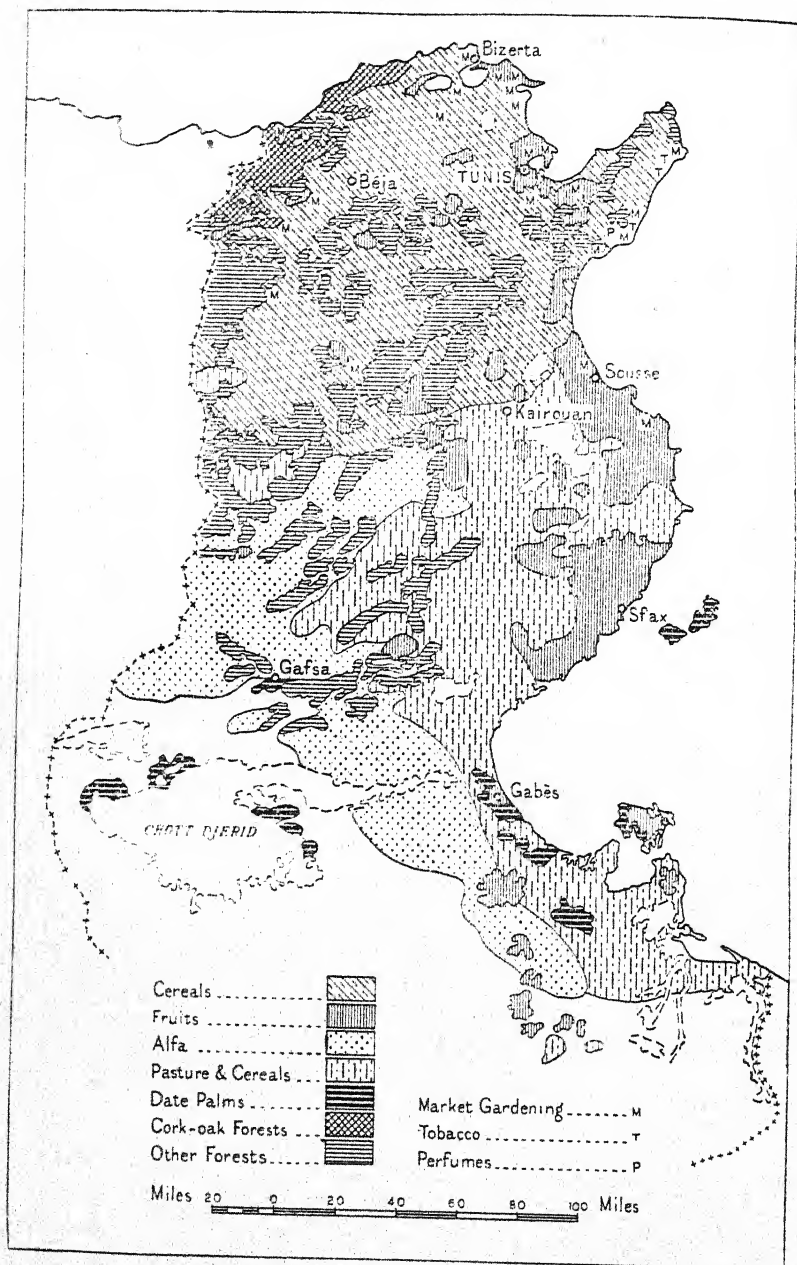


FIG. 55. *The distribution of crops and forests*

it gives a tilth which helps to conserve the moisture in the soil. When the trees come into bearing the mgharsi becomes the owner of half the plantation. In many cases the native continues to work the landlord's plantation as well as his own under the contract of mougakate, by which he receives two-thirds of the harvest in payment. This last form of contract is, however, discouraged by the French authorities because it makes possible absentee ownership with its obvious disadvantages.

There are no irrigation schemes in northern and central Tunisia comparable with those of northern Algeria or French Morocco. The only dam used for irrigation is on the site of an ancient dam at Bathan near Tebourba on the Oued Medjerda: it was restored and improved in 1935 to store water for the plain of Tebourba for the production of cereals, vines, and olives (Photo. 173). The dam at Sidi bou Beker on the Oued el Kebir (the upper Oued Miliane) is used for the water-supply of Tunis (Fig. 47; Photos. 18, 19). There are various small local irrigation schemes in the plains of Kasserine and Sbiba and elsewhere. In southern Tunisia artesian wells supply water to many of the oases.

In order to improve native agricultural methods several institutions have been established by the Department of Agriculture and Trade. They include the school of agriculture, the École Coloniale, at Belvédère in Tunis, which has students for a period of three years for theoretical and practical agricultural work; an agricultural research station, the Service botanique et agronomique, between Tunis and Ariana; the Sidi Naceur training-farm at Depienne (Smindja); a stock-breeding establishment at Sidi Tabet; a veterinary college, the Institut Arloing, in Tunis; and an experimental olive-growing station at Sfax. There are also numerous native and European schools mainly concerned with agricultural education, and practical training is given to apprentices in the Jardins d'Essai of the larger towns such as Tunis, Sfax, Bizerta, and Kairouan.

Soils

The most fertile soils of Tunisia are in the Medjerda valley and in the lowlands round Bizerta and Tunis. Climate has a marked influence on the soils of the country. In north-western Tunisia, where the rainfall is heavy, podzols are extensive, and the region is generally forested: these soils are similar to the forest soils of north-western Europe, and are especially suited to the growth of cork oak. The rendzinas and red and brown soils of the Tell south of the northern

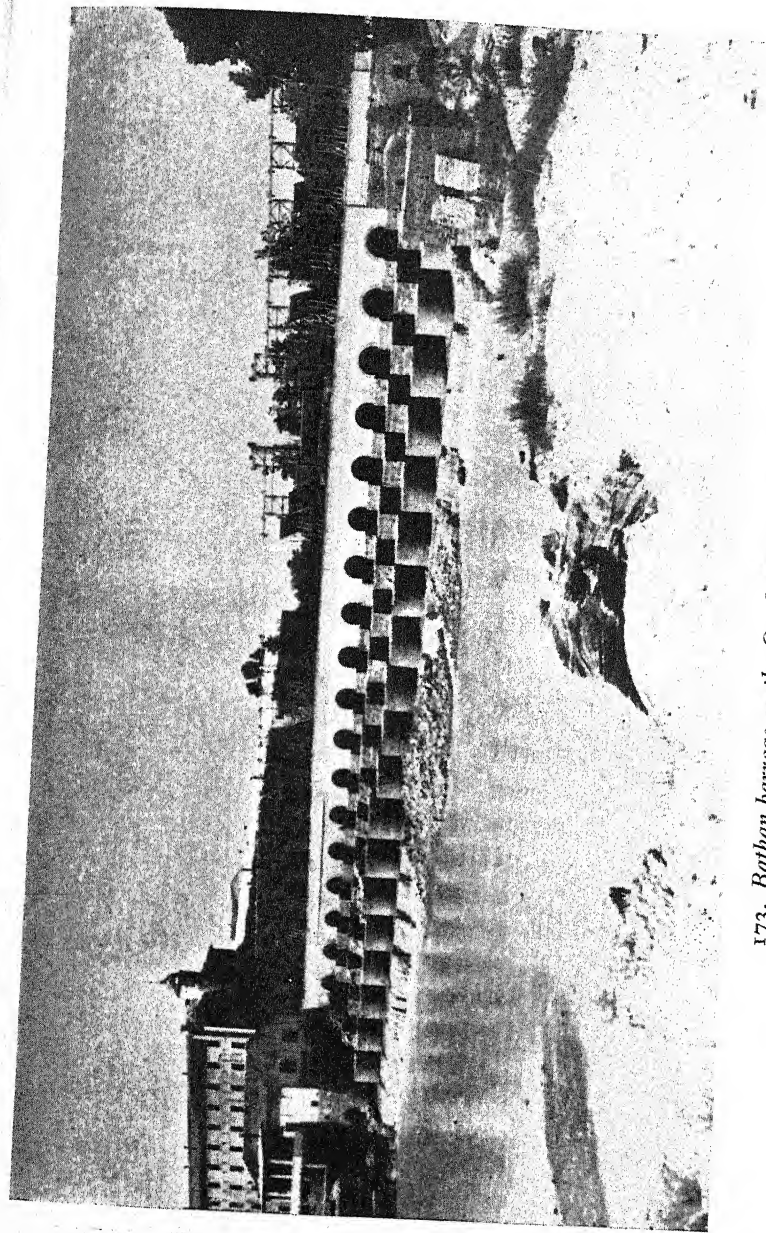
highland ridges are the best districts for cereals: these soils, with the alluvium of the river valleys, provide the most fertile regions of Tunisia. In the plains the soils differ according to their origin, and those of the plains between Tunis and Medjez el Bab owe their reddish colour to the *limon* washed down from the slopes. The Dorsale has rather poor soils and is, therefore, mainly under forests.

In the regions of lower rainfall, steppe and semi-steppe soils are common: in the mountains there is almost no cultivable soil, but in the valleys and plains the soils are rich in gypsum and carbonate of lime and are generally fertile. Sandy soils, which are poor in damp regions, are good for cultivation in dry areas because they contain all the substances of the rock from which they are derived. This is particularly noticeable in eastern Tunisia, where the soil provides good land for olives and for arable farming, but is exposed to erosion because the vegetation is scattered and open. If cultivation ceases, the ground loses its protection against erosion by wind and water. Some attribute the impoverishment of the land to torrential rains, which have exposed the limestone crust and washed away the humus in the lower parts: others attribute it to deforestation. The exposure of the crust is common on hill-sides, with a corresponding increase in the thickness of alluvium in the valleys. The lack of humus in the soil cannot be exaggerated, the steppe soils being especially poor. Farther south, the country becomes true desert, and there is little or no vegetation except in the oases. In the region of the chotts and round many of the sebkhas the soils are saline and infertile.

Agricultural Colonization (Fig. 56)

The French Government in Tunisia was at first reluctant to embark upon the agricultural settlement of Europeans in the country in view of the many difficulties encountered by colonization in Algeria. As a result, the first attempts at colonization were entirely due to private enterprise, and vast domains were bought up by a few enterprising men or land companies; thus of the 1,094, 700 acres (443,000 hectares) owned by French persons in 1892, 1,027,900 acres (416,000 hectares) belonged to sixteen individuals. The Government attempted to remedy this situation by various small-scale colonization schemes and by the putting up for sale of the public habus (p. 186) and large Moslem estates, but official colonization really started only in 1900, under pressure of public opinion.

A decree of 1903 committed the State to co-operate in agricultural colonization and created the necessary organization. Water and com-



173. Bathen barrage on the Oued Medjerda near Tebourba



174. *Ploughing, near Tunis*



175. *Field of artichokes, Djedeida*

munications were provided as far as possible, and though the Government did not grant free concessions, land was sold at low prices and on easy payment terms. Between 1900 and 1914 the Government granted nearly 310,000 acres (125,000 hectares) to new settlers in lots of 250 acres (100 hectares) or more: large areas of steppe land were also distributed, but there was still little immigration of French people from metropolitan France. Most of those who took up the land were either already resident in Tunisia or came from Algeria, and by 1914 one-third of these people had sold their holdings. After the War of 1914-1918 many of those who returned were unwilling to do the work necessary to put their property in order again, and, as prices were high, there was a great temptation to sell. Altogether nearly 200,000 acres (80,000 hectares), one-seventh of all the land held by the French, changed hands in the period following the war: in north-eastern Tunisia it was bought mainly by Italians, and elsewhere by native farmers.

The influx of Italians, either as labourers or as small farmers, has been a constant cause of alarm to the French Government for many years, as described on pp. 140-143. Many of the Italians were peasants, who worked for comparatively low wages on the French estates: by working hard they were often able after some years to buy a few acres of land near the farms on which they worked. Thus many large French estates became surrounded by small plots owned and worked by Italians. The prospects were so attractive to peasants on the large and almost feudal estates of parts of Italy that immigration continued on a large scale, and the French Government had to adopt new measures in order to attract wealthier citizens. All new settlers were compelled to possess a certain amount of capital and were kept strictly to their agreements. But although credits were granted to farmers in real need, the number of Frenchmen settling on the land remained small, and in 1931, 18.1 per cent. of the Italians were engaged in agriculture compared with only 11 per cent. of the French population. One of the main obstacles has been the shortage of labour in rural areas, particularly since 1914. Cereal farmers have met this shortage by mechanization, but the situation is serious in the vineyards and olive-groves where much of the work must of necessity be done by hand.

Outside northern Tunisia the native, with a standard of living still lower than that of the Italian settler, has generally managed to keep the growing of cereals and olives largely in his hands, even though the land is often owned by the French; in the oases the native nearly

always owns as well as works the land. Thus the land in Tunisia is being divided up between natives and Italians, rather than Frenchmen. In spite of all the attempts at colonization, the French con-

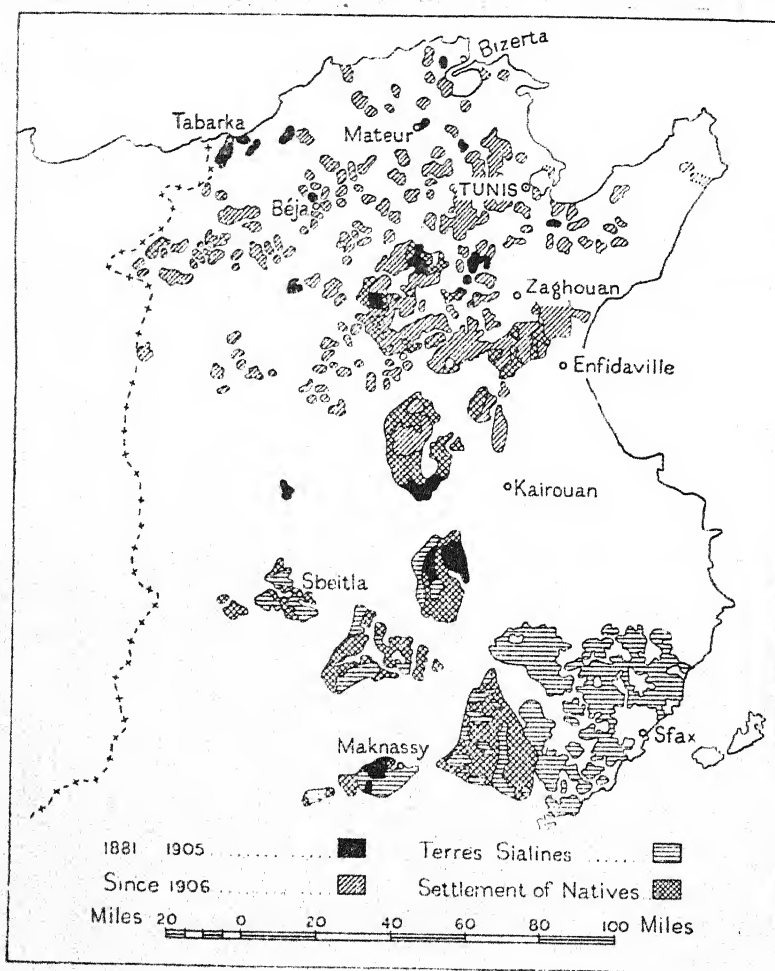


FIG. 56. *Agricultural colonization*

tribution is still more in money than in men. French capitalists own large estates, but these are worked by native and Italian labour: the Société Franco-Africaine operating the great Enfida estate of 250,000 acres (100,000 hectares), for example, employs 100,000 natives but only a few Frenchmen.

Colonization in Northern Tunisia. Colonization in northern Tunisia was at first slow because the alluvial plains and valleys had the reputation of being unhealthy. Although several allotments of land near Mateur and Bizerta were made in 1894 and 1895, little settlement took place until after 1900. Between 1896 and 1905, 137,000 acres (55,598 hectares) of land forming 769 lots were made available for French colonization at Pichon, Goubellat, la Mornaghia, Massicault, Depienne (Smindja), Tabarka, Béja, and elsewhere. By 1918, 254,500 acres (102,896 hectares) had been colonized, mainly in the region between Tunis, Bizerta, Souk el Khemis, and Zaghouan. Few of the areas were large, Pichon, Goubellat, and Massicault alone exceeding 15,000 acres (6,000 hectares), and only twenty being large enough to establish more than ten French families. The creation of villages, considered essential in Algeria, has been regarded as of secondary importance in Tunisia, and only thirteen had been established by 1914.

Since 1919 numerous decrees have been framed to stimulate French colonization. Special benefits were offered to colonists, particularly as regards payment, in order to attract settlers from France and Algeria. Land was acquired from the Enfida estate and from the lands of the Jewish Alliance at Djedeida. All purchasers were required to live on their land and to develop it themselves for at least ten years and, since 1924, twenty years. By 1930, 390,350 acres (157,952 hectares) forming 1,167 lots had been settled and 22 new centres established, but only 182 of these lots were taken by immigrants, two-thirds of whom came from Algeria and the rest from metropolitan France. The position in northern Tunisia in 1930 is summarized by the following figures:

	Hectares	No. of rural allotments
1896-1905 . . .	55,598	769
1906-1918 . . .	47,298	481
1919-1930 . . .	157,952	1,167
TOTAL, 1896-1930 .	260,848	2,417

In addition there were 646 allotments of land to small farmers and artisans covering 3,510 acres (1,421 hectares), making a grand total of 647,107 acres (262,269 hectares), of which 236,836 acres (95,844 hectares) were State lands.

Colonization in Central and Southern Tunisia. Large areas of land in the Sfax district were granted in the sixteenth century to Salem Hassan el Ansary, sold by his descendants to the Siala family, and

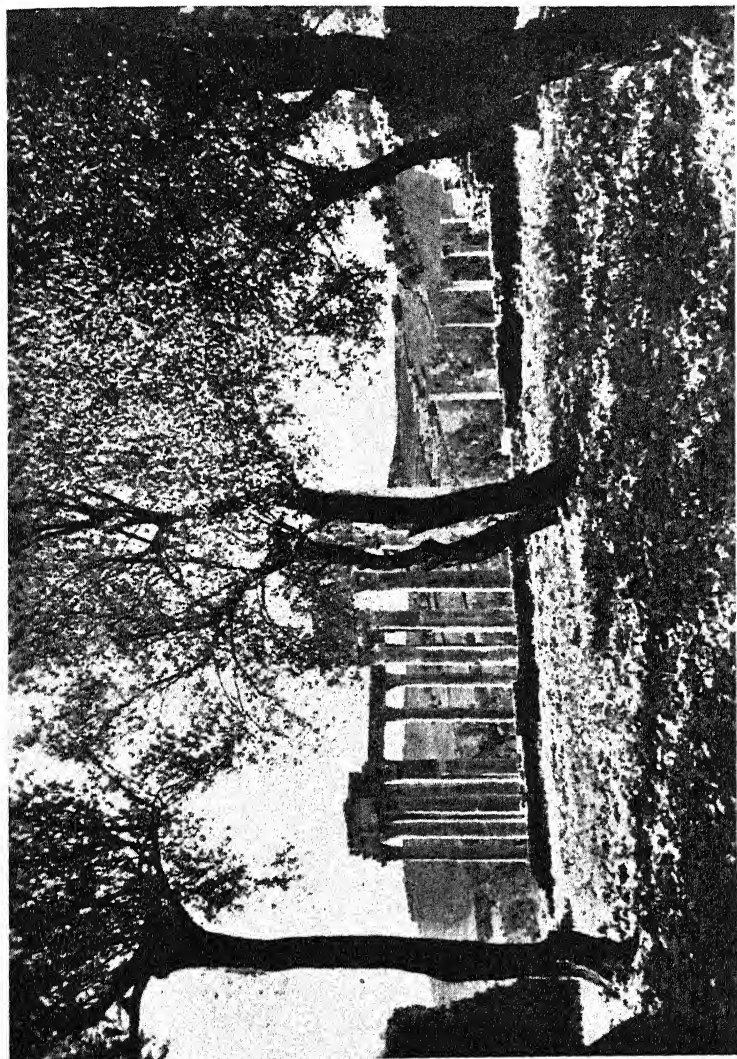
returned to the Bey in 1871: they are generally known as the *terres sialines*. A decree of 1892 arranged for the transfer of some of these lands to Europeans or natives at 10 francs per hectare, on condition that plantations were developed on them. Immediately there was a large demand, 142,000 acres (57,500 hectares) being taken up within a year. At first the whole land had to be planted within four years, but this, by eliminating first stock-raising and then cereal cultivation, led to the collapse of the economy of some parts of the Sfax district, and a decree of 1905 limited the obligation to plant to one-half of the area granted. Similar grants were made in the Maknassy, Sidi Naceur Allah, Sbeitla, Kasserine, and other districts. Under a decree of 1918, modified by further decrees in 1925, land granted must be cleared, and at least two-fifths planted with fruit-trees, within four years, and cannot be given up for twenty years without the permission of the Director of Agriculture. If a French family be established, the price of the land is reduced by 50 per cent. The extent to which land had been allotted by 1930 is shown by the figures below: nearly all of it has been planted with olives.

	French		Natives		Total	
	Hectares	No. of lots	Hectares	No. of lots	Hectares	No. of lots
1892-1918. . .	64,697	170	41,059	6,339	105,756	6,509
1919-1930. . .	81,340	97	6,380	1,611	87,720	1,708
TOTAL, 1892-1930 .	146,037	267	47,439	7,950	193,476	8,217

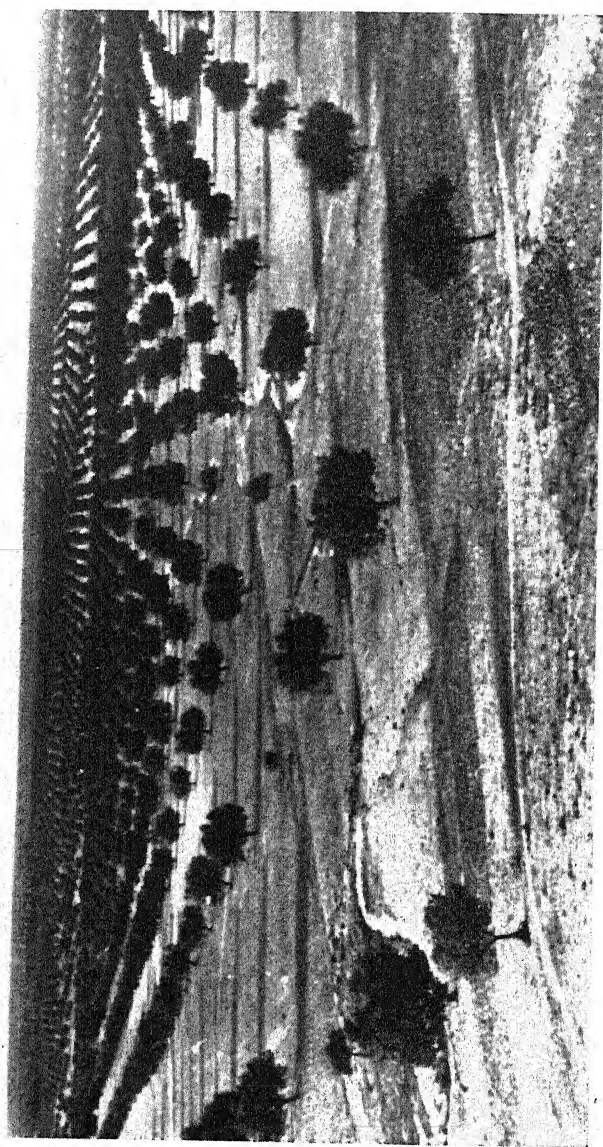
Settlement of Natives. A decree of 1918, modified by one of 1925, fixed the conditions under which lands belonging to the State domain were granted exclusively to native farmers. Land was given for five years in the first place, and the occupant was obliged to cultivate it and erect such buildings as were necessary. Under this scheme 17,185 lots covering 345,335 acres (139,767 hectares) were settled by 11,890 families between 1920 and 1930.

Cereals

The cultivation of cereals is the main branch of Tunisian agriculture judged in terms of acreage. Altogether about $2\frac{1}{2}$ million acres (1 million hectares) are devoted to cereals each year, principally hard and soft wheat, barley, and oats. Much smaller acreages of maize, sorgho, and millet are planted. The natives are the main producers of cereals, particularly hard wheat and barley. European



176. *Olives in the High Tell, Dougga: Temple of Venus or Dea Caelestis in background*



177. *Olives in the Sahel of Sfax*

cereal farmers concentrate on soft wheat and oats, especially in the Béja and Mateur districts, in the Medjerda valley, and around Enfidaville. Both Europeans and natives practise extensive cultivation and biennial rotation of crops with fallow land, but whereas the natives leave the land alone during the fallow year, the colonists employ dry-farming methods and cultivate the soil continuously. Such methods not only help to destroy weeds and enrich the soil with nitrogen, but

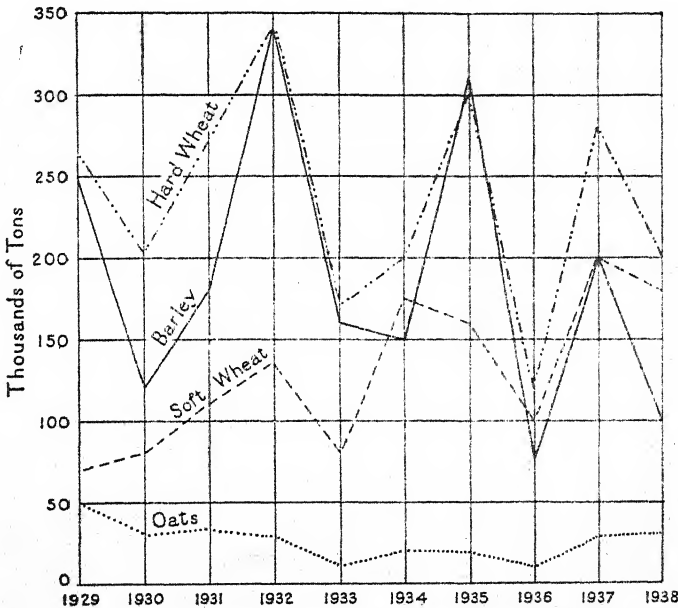


FIG. 57. *The production of cereal crops, 1929-1938*

above all assist the penetration and storage of water. Many native farmers are now copying these methods and are substituting French ploughs of a simple pattern for their old and primitive implements.

Table I of Appendix H gives the area and production figures for cereals from 1929 to 1938. The fluctuations in the production of the main cereals in the same years are shown diagrammatically in Fig. 57.

Wheat (Fig. 58). Wheat is the principal cereal produced in Tunisia, both hard and soft types being grown. Hard wheat, which occupies a greater acreage than that under any other cereal, is grown mainly by the natives: in 1937, 2,051,000 acres (830,000 hectares) were under hard wheat and 280,000 tons were produced. Soft wheat is mainly a European crop: 378,100 acres (153,000 hectares) gave

200,000 tons in 1937. These figures clearly reveal the good yields obtained by European farmers compared with the very low yields of most native producers. The principal wheat-growing districts are in northern Tunisia, which accounted for 244,000 tons and 194,000 tons of the hard and soft wheat respectively in 1937, whereas central and southern Tunisia produced only 36,000 tons of hard wheat and 6,000 tons of soft wheat. The principal areas are in the Medjerda valley, especially between Ghardimaou and Béja and in the delta region between Utique and the Lac de Porto Farina, in the Mateur district, and in the valley of the Oued Miliane. The Lower Tell and the Tunis region are less well watered and produce smaller quantities of wheat. In the steppes of central Tunisia the best lands are generally kept for wheat, especially if they are liable to flooding and have slightly heavy soils, such as the plains of Kairouan and Gamouda.

Wheat is harvested between May and July in the north and in May and June elsewhere. Hard wheat is eaten mainly by the natives, and manufactured into groats, macaroni, spaghetti, and similar products: there is usually an export of hard wheat (36,113 and 27,036 tons in 1937 and 1938 respectively). Soft wheat (*tuzelles*) is used by the Europeans in Tunisia and is exported on a considerable scale to France, where it is marketed before the French wheat crop is harvested: in consequence Tunisia has to import soft wheat for its own consumption later in the year. In 1937, 32,248 tons of soft wheat were exported and 6,168 tons imported; in 1938, 55,164 tons were exported and only a negligible quantity imported. Exports of wheat flour averaged 14,000 tons in the years 1936-1938.

Barley (Fig. 58). Barley is widely grown, and about 95 per cent. of the total crop is produced by native farmers. Being more hardy than wheat, it can grow in most districts, but is especially important in the centre and south. Formerly it was cultivated extensively in the north, but has now been partly replaced by soft wheat. In the districts between Sousse, Kairouan, and Maharès, and between Gabès and Médenine, more than 50 per cent. of the total area devoted to cereals is under barley. The area planted and the production figures vary considerably from year to year, but the yield per acre is always much higher in northern Tunisia than elsewhere. In 1937, 1,532,000 acres (620,000 hectares) produced 200,000 tons of barley—88,000 tons from 383,000 acres (155,000 hectares) in the north, and 112,000 tons from 1,149,000 acres (465,000 hectares) in central and southern Tunisia. In 1938 the total area under barley fell to 741,300 acres (300,000 hectares) and production to 100,000 tons.

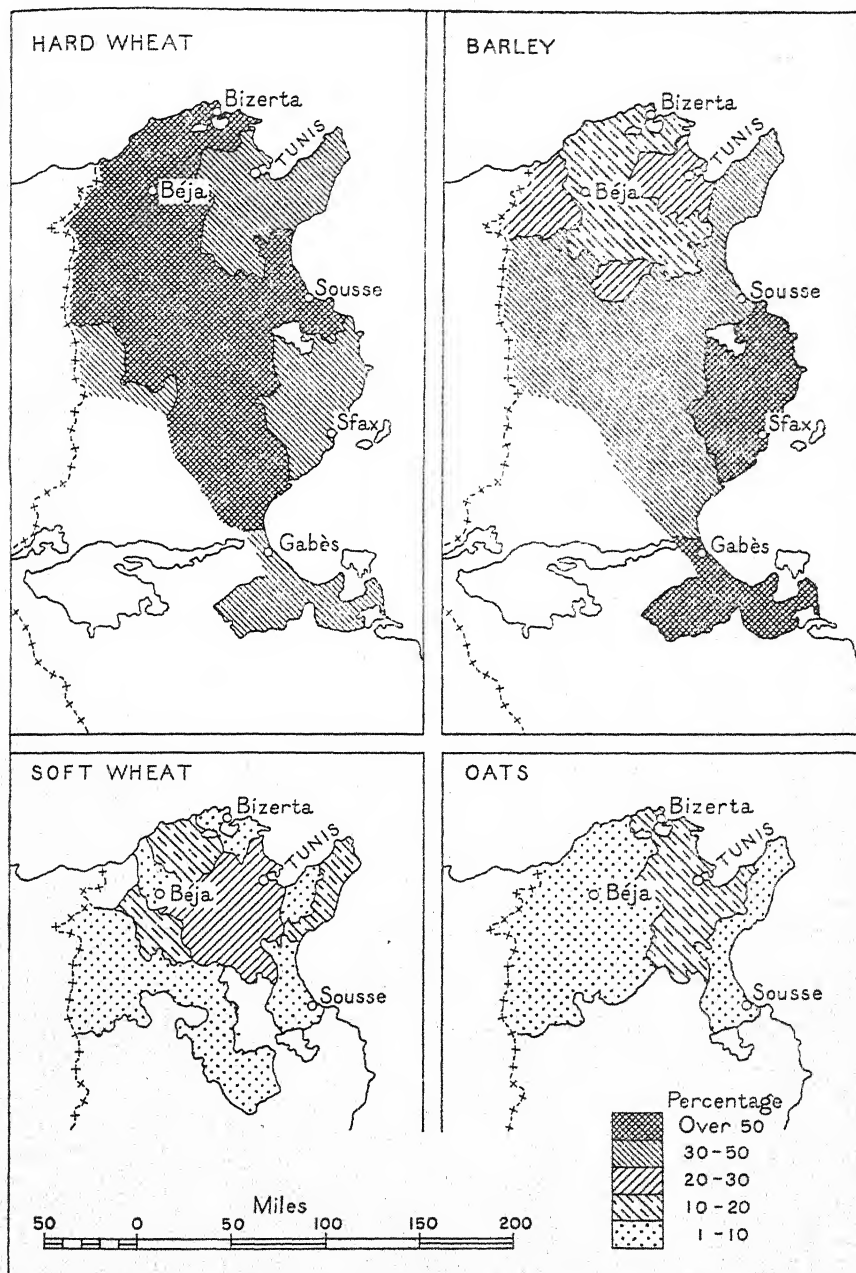


FIG. 58. The distribution of cereals (percentage of total area under cereals)

Besides the part it plays in the natives' economy, barley is exported in normal times, breweries in the United Kingdom and France being important purchasers: the barley grown in the south is very white and before the present war was in considerable demand in England. In 1937, 34,037 tons were exported, but only 12,942 tons in 1938: of the latter figure 5,947 tons went to France and 6,969 tons to Algeria. In recent years there has been a general decline in overseas sales, partly because of the competition of French Morocco.

Oats (Fig. 58). Oats are not grown as extensively in Tunisia as in Algeria. The crop was introduced by European colonists, who grow it chiefly as fodder, but the natives have taken up its cultivation increasingly, especially around Kairouan. The area under the crop has varied in recent years between 62,000 acres (25,000 hectares) and 100,000 acres (40,000 hectares), and production between 10,000 and 30,000 tons. In 1937, 91,430 acres (37,000 hectares) were devoted to the crop, about 60 per cent. of the total being on European farms, and production was 28,500 tons. Northern Tunisia, especially the lower Medjerda valley and the Lower Tell, accounted for the bulk of the crop: the rest of the country produced only 1,300 tons from 6,178 acres (2,500 hectares). A considerable quantity is exported, almost exclusively to metropolitan France and Algeria (11,761 tons and 7,937 tons in 1937 and 1938 respectively).

Maize. Maize is grown on only a limited scale, by the natives for food, and by Europeans for fodder. It is confined to the comparatively well-watered districts in the north and to irrigated land elsewhere. In 1938, 42,000 acres (17,000 hectares) produced 5,000 tons of maize, and 9,837 tons had to be imported to satisfy the internal demand.

Sorgho. Sorgho, known by the natives as *bechna*, is a summer crop which needs good spring rains. Most of it is grown by natives in the Kroumirie and the Mogods, though a few Europeans cultivate it as a fodder crop. Acreage and production figures have been combined with those for maize in recent years: the latest figures for sorgho alone are for the period 1924-1931, when an average of 3,870 acres (1,566 hectares) was under sorgho in the northern Tell, especially in the Ain Draham district.

Millet. A little millet is grown by the natives to supplement their diet when other grain crops are in short supply, and some European farmers grow it for fodder.

Non-cereal Crops

The only non-cereal crops grown on any scale, apart from fruit and alfa, which are separately described below, are vegetables and various

fodder crops, the products of the market gardens of Tunisia. The production of 'industrial' crops such as tobacco, flax, and cotton is only small and inadequate to supply the country's internal demand.

Market Gardening. Market gardening has developed rapidly in French North Africa in the last twenty-five years, but Tunisia has met with relatively little success in marketing her crops, and exports are slight compared with those of Algeria and French Morocco. In 1936, for example, Algeria exported 139,000 tons of market-garden produce, Morocco 26,000 tons, and Tunisia only 5,400 tons. This latter figure, however, was $4\frac{1}{2}$ times the export in 1934 (1,256 tons) and nearly 40 times that of 1930 (140 tons). The area under cultivation by Europeans is mainly in the Tunis and Bizerta districts and in the Cap Bon peninsula: elsewhere the natives are the main producers. By means of irrigation, almost any vegetable of temperate or sub-tropical latitudes can be grown in north Africa, including tomatoes, artichokes, beans, peas, cabbages, lettuces, celery, turnips, carrots, asparagus, pumpkins, peppers, and onions.

Various types of peas and beans are grown in Tunisia, notably broad and runner beans, lentils, and chick-peas. They usually require from 15 to 20 inches of rain per annum, though some varieties are adapted to drier areas. Broad beans occupy between 50,000 and 62,000 acres (20,000 to 25,000 hectares), yielding from 15,000 to 20,000 tons. Lentils are well suited to the climatic conditions of parts of southern Tunisia and are grown particularly on the Île de Djerba: they can be grown even at Matmata if sown in December or January. The chick-pea is a deep-rooted annual which matures in about ninety days and is well suited to semi-arid regions. Unfortunately its foliage is poisonous and so cannot be used for fodder. The green pods are eaten and the nutritious seeds used in soups. Production is normally about 4,000 tons from an average area of 21,000 acres (8,500 hectares).

The carob, a small evergreen tree indigenous to Mediterranean countries, is cultivated for its pods and seeds which are a valuable cattle food. There are 20,000 trees in Tunisia, and the annual production is about 1,500 tons. Fenugreek, an annual legume with white flowers and long slender pods, is also grown mainly for fodder. Bersim (a type of clover), alfalfa, and vetch, which are important sources of hay, are often planted with fenugreek or with barley or oats.

Tunisia produces considerable quantities of potatoes, the only important root-crop grown in north Africa. Rather more than 5,000 acres (2,000 hectares) are planted in most years, and production

ranges from 6,000 to 10,000 tons. The main crop is planted in August and September and harvested in January and February, but potatoes are also planted at the end of January and gathered in April and May. Porto Farina is the centre of the main producing district.

Tomato cultivation has been mainly in the hands of the natives until recent years when there has been some specialization in the crop by European farmers and small-holders in the Cap Bon peninsula. Planting takes place in March and April and picking begins in July.

Beetroot, planted in November and harvested in May and June, and carrots, which are available throughout the year, are widely grown. Artichokes are grown mainly around la Mornaghia and Djedeida (Photo. 175), peppers in the Cap Bon peninsula, melons in the Cap Bon and Djedeida districts, and asparagus in the oases of the south.

Tobacco. Tobacco occupies only about 1,000 acres (400 hectares), producing an average of 600 tons per annum: this is insufficient for the needs of the country which have to be met by imports (1,119 tons in 1937). It is grown mainly in the Cap Bon peninsula, especially in the coastal strip between Kelibia and Hammamet: small amounts are also grown in the Mogods around Sedjenane and beneath the shade of date-palms in the Gabès oasis. There is a tobacco factory in Tunis.

Flax. Attempts to grow flax in Tunisia have met with little success, and only about 6,200 acres (2,500 hectares) are devoted to the crop. It is grown for linseed oil, production of which has declined steadily from 1,200 tons in 1929 to 100 tons in 1937.

Cotton. Cotton is a difficult crop to produce and pays only when prices are high. The only cotton produced in Tunisia comes from the comparatively wet areas of the Nefzas and the Mogods and from around Korba on the south-eastern side of the Cap Bon peninsula. It is also grown on a small scale under irrigation in some of the oases of the Djerid.

Other Industrial Crops. These include plants from which perfumes are obtained, such as roses, jasmine, lavender, verbenas, and geranium; thyme, mint, and aniseed are also grown. The main distillation centres are Nabeul, Hammamet, and Sfax.

Fruits

Many types of fruit are grown in Tunisia, particularly olives, grapes, dates, citrus fruits, and figs. Smaller quantities of almonds, apricots, peaches, plums, and pomegranates are produced, and apples, pears, quinces, medlars, and bananas are cultivated in a few districts. Apart from the olive, nearly all these fruits are confined to coastal



178. *Olives in hollow among sand-hills near Djemmal, Sahel of Sousse*



179. *Olive-grove in the Sahel of Sfax*



180. *Cultivation of apricots beneath date-palms, Tozeur*

areas and oases, because elsewhere the danger of damage by frost or by the sirocco is great.

Olives (Fig. 59; Photos. 176-179). The olive has been grown in the Mediterranean region since prehistoric times. It is a small evergreen tree which reaches a great age, becoming at length extremely gnarled and twisted. It grows extensively in Tunisia, and wild olives are still common in many districts (Photo. 77). The olive is the outstanding product of eastern Tunisia.

French North Africa's production of olive-oil is usually surpassed by that of Spain; its export, however, is considerably greater and in 1938 exceeded 70,000 tons, of which Tunisia accounted for 35,193 tons. In addition much oil is consumed within the country, olive-oil being the main edible oil produced. Altogether there are at least 19 million trees, mostly owned by natives; 220,000 natives pay the tax on olive-trees, known as the kanoun (p. 360), and only 1,000 Europeans. About 4 million of these trees are in the north, 7.2 million in the Sahel of Sousse and north-central Tunisia, and 7.6 million in the Sahel of Sfax and southern Tunisia. The increase in the number of trees since 1882, particularly in the Sfax district, is shown by the following table:

	<i>No. of olive-trees</i>			<i>Increase,</i>
	<i>1882</i>	<i>1934</i>	<i>1938</i>	<i>1882-1938</i>
Northern Tunisia . . .	2,400,000	4,119,000	4,200,000	1,800,000
Sahel of Sousse and north-central Tunisia . . .	4,500,000	7,062,000	7,200,000	2,700,000
Sahel of Sfax and southern Tunisia . . .	1,240,000	5,975,000	7,600,000	6,360,000

In northern Tunisia the areas of cultivation are usually small and scattered, with a rainfall of between 16 and 20 inches. The principal areas are around Béja, Bizerta, Tabarka, Souk el Arba, Tunis, Zaghouan, Grombalia, TebourSouk, and Medjez el Bab.

In the Sousse region and in the northern parts of central Tunisia the rainfall averages 12 inches per annum. Besides the Sahel of Sousse, the Kairouan, Pichon, Maktar, and Thala districts are leading producers. The olives are planted in terraces in the valley bottoms and on the lower slopes of the hills, and often form small groups separated by ridges of earth which form the more or less rectangular basins known as 'manqa'. The trees suffer through lack of care by the natives and because of the extreme division of property: a single tree may belong to two or three persons, each owning some of its branches.

The Sahel of Sfax and southern Tunisia have some of the best olive-groves in the country despite the low and variable rainfall. The

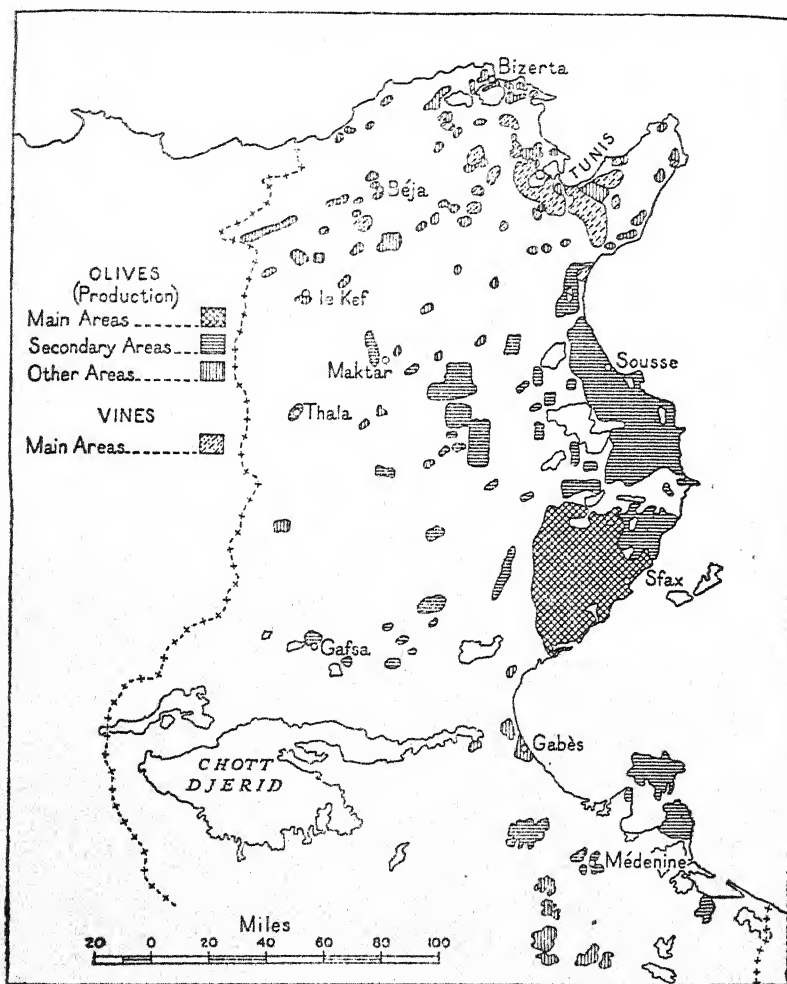


FIG. 59. *The distribution of olives and vines*

trees are planted far apart to allow ample room for the development of the roots: there are only 16 or 20 trees to the acre compared with as many as 630 to the acre in the north (Photo. 179). Dry-farming methods have been adopted to conserve all possible moisture, the soil being kept pulverized by ploughing and by a special implement,

the 'maacha', a form of plough, the main part of which is a horizontal metal blade. The trees are well pruned, the fruit is gathered carefully, and the natives have been educated in the best methods of olive cultivation so that yields have improved considerably during recent years. There has been a very great increase in the number of trees during the last fifty years, and the groves now occupy more than a million acres (450,000 hectares). Besides the Sahel of Sfax there are scattered groups of olive-groves around Gafsa, Maknassy, Gabès, Matmata, Médenine, Fom Tatahouine, and Zarzis, and on the Île de Djerba.

Great progress has been made in the methods of processing since the early years of the Protectorate, and there are now over 1,500 factories producing good quality olive-oil, besides a few of the native presses which still manufacture oil for local consumption in outlying districts. There are also nineteen factories extracting oil from olive cake, and a similar number of refineries and soap factories which can process all the olive cake produced by oil-extraction plants. The possibility of using olive-oil as a lubricant has been examined, and a decree of 1936 made a percentage of olive-oil obligatory in all motor oils sold in Tunisia: the application of the decree was, however, postponed indefinitely when the price of olive-oil rose suddenly. Between 3,000 and 6,000 tons of oil are produced annually from residues (*grignons*): this oil is used industrially, mainly for soap-making, and a large percentage normally goes to the U.S.A. The total production of oil varies considerably from year to year, according to climatic conditions and the incidence of insect pests. Output has ranged from 15,000 to 60,000 tons in recent years, and exports have varied accordingly.

The table below summarizes the position during the period 1933-1939, though the production figures are almost certainly underestimated. Table III of Appendix H gives figures for the main olive-producing caidats.

Year	Total no. of trees	Trees in production	Production of olive-oil (tons)	Export of olive-oil (tons)
1933 . .	17,122,604	12,609,764	60,000	62,060
1934 . .	16,738,604	12,307,963	55,000	53,810
1935 . .	17,144,000	12,637,000	60,000	49,180
1936 . .	17,150,000	12,307,000	15,000	31,120
1937 . .	17,366,000	13,282,000	50,000	18,790
1938 . .	17,766,000	13,283,000	30,000	40,480

Vines (Fig. 59). As wine is forbidden to Moslems, the natives grow vines on a comparatively small scale, and at the time of the establishment of the French protectorate there were only about 2,700 acres (1,100 hectares) of native-owned vineyards. In 1938 there were 108,700 acres (46,000 hectares) under the vine, all belonging to Europeans apart from about 10,000 acres (4,000 hectares) of widely scattered native-owned vineyards: the latter occur even as far south as the Djerid oases where, with abundant water, the vines climb up the trunks of the date-palms. Most of Tunisia's vineyards are on light soils in the fairly well-watered north-east, notably around Tunis, Grombalia, Korbous in the Cap Bon peninsula, and Tebourba. Other districts of northern Tunisia are too wet, the higher parts of the country are liable to frost, and the steppes are too dry and also experience the sirocco, which would damage the vines.

The vine has been cultivated intensively since about 1890, when many of the vineyards of metropolitan France were destroyed by the phylloxera. The holdings, many of which are owned by Italians, are generally small, varying between 25 and 37 acres (10 to 15 hectares). The phylloxera first appeared in Tunisia at Souk el Khemis in 1906, since when it has gradually spread in spite of rigorous control measures, though much of the country has so far avoided its devastation. Although the Souk el Khemis vineyards were destroyed, the insect was discovered in 1928 at le Kef, and in 1936 at Nassen, only 6 miles from Tunis in the centre of the vine-growing area. All the infected vineyards were destroyed, and at least until the beginning of the present war all vineyards were subject to very strict inspection, but eventually the industry will have to be re-established with grafted vines.

Tunisian wine is rich in alcohol, the content usually being between 13 and 14 degrees, with its volatile acidity seldom exceeding 1 per cent.: since 1931 it has been illegal to export any wine with a strength of less than 11 degrees. The production of wine in 1938 exceeded 43,470,000 gallons (1,976,000 hectolitres), obtained from 103,780 acres (42,000 hectares): 6,000 tons of table grapes were produced in the same year from about 10,000 acres (4,000 hectares). Because of over-production in French North Africa, the planting of new vineyards has been prohibited in French Morocco, Algeria, and Tunisia since 1935, and in Tunisia alone nearly 20,000 acres (8,000 hectares) of vineyards were abandoned between 1934 and 1938. High tariffs made it difficult for Tunisia to export her wine except to France, and the price of Tunisian and other north African wines was



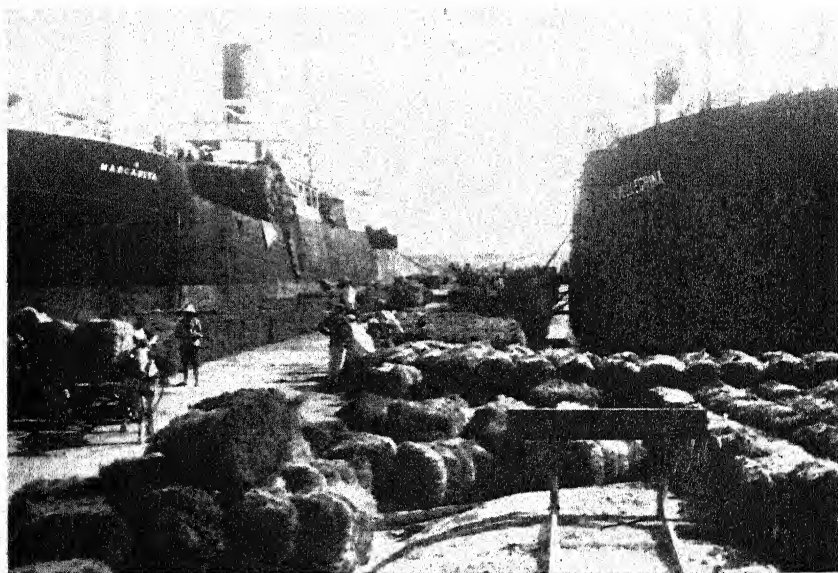
181. *Date-palms, Douz in the Nefzaoua*



182. *Palm-grove, el Hamma du Djerid*



183. *Alfa market, Matmata*



184. *Quai des Alfas, Sfax*

largely determined by the nature of the harvest in metropolitan France. Exceptionally good yields in France meant ruin to the north African vine-grower, whose whole income often came from his vines.

The following table gives the most recent acreage and production figures available:

Year	Bearing area of vineyards (hectares)	Vineyards for wine		Vineyards for table grapes	
		Area (hectares)	Production (hectolitres)	Area (hectares)	Production (tons)
1928-1933 .	43,000	38,800	1,184,000	3,300	5,800
1934 . .	48,000	44,000	1,700,000	4,000	6,000
1935 . .	49,000	44,593	1,700,000	4,000	6,500
1936 . .	47,000	42,578	1,420,000	4,400	5,500
1937 . .	47,000	42,578	1,454,000	4,400	6,000
1938 . .	46,000	42,171	1,976,000	4,000	6,000

Dates. Dates have for many centuries been a staple, and often the only, product of the oases of southern Tunisia. All parts of the date-palm are used: its leaves, for example, make baskets and mats, its fibre is used for rope, the timber is valuable, and cereals and other crops are often grown beneath its shade. It needs plenty of water, although a hot, dry climate is necessary for fruiting. Most of the Tunisian date-palms are in the Djerid oases on the north-western side of the Chott Djerid (900,000 palms including 320,000 around Tozeur, 240,000 at Nefta, 180,000 at el Oudiane, and 80,000 at el Hamma), in the Nefzaoua on the south-eastern side of the chott (500,000), and around Gabès (200,000) and Gafsa (75,000); there are also many palms, producing dates of poor quality, on the Île de Djerba and around Zarzis (Photos. 80, 180-182). The Djerid and the Nefzaoua, which are supplied by artesian wells, account for the whole of the Tunisian production of the *deglet-nour* (finger of light) type of date and one-sixth of the total for French North Africa. This variety is exported, mainly to France (993 tons in 1938). The drier types are eaten within Tunisia, and 2,485 tons were exported to Algeria in 1938. The number of date-palms and the production of dates in 1937 were as follows:

	No. of date-palms	No. bearing	Production of dates (tons)
Deglet-nour	194,000	91,651	4,000
Other dates	2,481,000	1,413,594	28,000
TOTAL	2,675,000	1,505,245	32,000

Citrus Fruits. Citrus cultivation is less developed in Tunisia than elsewhere in French North Africa, mainly because of the inadequacy of the water-supply. Over 80 per cent. of the plantations are cultivated by natives, European farmers in the country having concentrated more on cereals, olives, and vines. In 1938 there were about 5,000 acres (2,000 hectares) under citrus fruits; oranges occupied 3,330 acres (1,347 hectares), lemons 740 acres (300 hectares), and clementines and mandarines 690 acres (280 hectares). Two-thirds of the plantations are in the Cap Bon peninsula and a quarter in the neighbourhood of Tunis, where particularly good fruit is obtained. There are other groves in the Bizerta and Sousse districts and in the oases of the south. In 1937 there was a production of 8,500 tons of oranges, 3,000 tons of mandarines, and 2,000 tons of lemons. Of the total about 8,000 tons were consumed locally, and this figure is likely to increase in the future. The Spanish Civil War stopped most of the citrus exports from Spain and caused high prices in the French market. This encouraged production in Tunisia, which sends the bulk of her exports of citrus fruits to France.

Figs. There are more than 1 million fig-trees in Tunisia producing about 15,000 tons of figs, which play a large part in the native diet in some districts. The methods for drying the fruit are usually primitive, and there is little possibility of an export trade developing.

Other Fruits. Of the many other fruits grown in Tunisia, the most important are apricots and almonds. About 3,000 tons of apricots are produced each year around Tunis, Bizerta, and Sfax. The annual production of almonds varies between 2,000 and 4,000 tons from about 800,000 trees: most of them are eaten by the natives, the export seldom exceeding 450 tons. Cherries, plums, and peaches grow extensively in the well-watered parts of the Tell, and early varieties are exported to Europe. Pomegranates, usually grown with oranges in the Cap Bon and Bizerta districts, are mostly eaten by the natives: there are probably about 800,000 trees. The pistachio, the quince, and the medlar, a small tree with a brown, apple-shaped, acid fruit, are cultivated on a considerable scale. There are about 400,000 apple and pear trees in Tunisia, though neither is very well suited to the climatic conditions of north Africa. Bananas are cultivated mainly in the coastal districts in the south, especially near Gabès.

Alfa

Alfa or esparto grass grows abundantly in Tunisia, covering an area of about 4,700 square miles (1,200,000 hectares). It requires no

cultivation and is a valuable export commodity. The best and most accessible supplies are in the steppe areas traversed by the railway lines from Sousse to Henchir Souatir and from Sfax to Gafsa. The principal markets include Thala, Sbeitla, Kasserine, Fériana, Gafsa, Sened, Maknassy, la Skhirra, and Gabès (Photos. 183, 184).

The grass is collected by hand, several leaves, usually less than ten, being pulled together. Though there is no prohibition on the gathering of alfa in certain months as there is in Algeria, little is pulled in the hot months between March and July. New grass begins to grow in January and, when young and green, provides fodder for animals. Alfa is usually carried by camels and pressed into bales at the nearest railway station. It is then railed to the ports of Sousse or Sfax, where foreign merchants have their own buying agents: smaller quantities are exported through Gabès. More than 95 per cent. of the exports go to the United Kingdom for the manufacture of high quality paper. The natives use alfa for making mats, rope, baskets, and 'scour tins' destined for oil plants: locally they use other fibres, such as diss grass, for the same purpose. Mats and rope are made by many of the people of the Îles Kerkenna, who obtain their best alfa from the mainland.

The alfa crop in any one year is estimated at about 150,000 tons, but the annual quantity produced varies considerably: in general, less is gathered when the cereal harvest is good, and a large alfa crop often indicates poor conditions in the interior. In 1938 exports reached the comparatively high figure of 129,409 tons.

Experiments have been carried out in Tunisia to obtain cellulose from alfa by fermentation. Leaves were allowed to ferment for sixteen days, after which they were washed in carbonate of soda and then in plain water. It was claimed that the results were as good as those obtained by the more expensive English method of treating the leaves with caustic soda under steam pressure.

Livestock

The raising of livestock is a leading occupation in most parts of Tunisia and an essential part of the country's economy. In 1937 there were 6,059,513 domestic animals in Tunisia, made up as follows:

Sheep	.	.	3,382,894	Mules	.	.	56,615
Goats	.	.	1,672,352	Asses	.	.	156,554
Cattle	.	.	507,302	Camels	.	.	144,762
Horses	.	.	109,787	Pigs	.	.	29,247

The number of livestock during the period 1928-1937 and their distribution by regions and caidats in 1937 are given in Appendix H (Tables IV, V).

In general the number of animals in the country has increased, and is probably at least double the number at the time of the French occupation. There are, however, fewer sheep on the larger estates of northern Tunisia, where the cultivation of cereals has been extended, and fewer draught animals where mechanical methods of farming or transport have been introduced. There has also been a general reduction in stock-rearing in the area under olives in the Sahel and, to a lesser extent, in the Low Steppes. Numbers vary considerably from year to year, according to climatic and other conditions (Fig. 60). The year 1920-1921, for example, was a good livestock year, but by 1923 a combination of wet and cold winters and dry summers had reduced the number of cattle by one-third, of goats by one-quarter, and of horses and mules by one-fifth. These losses were more than offset by the mild winter and fairly wet spring of 1925-1926. The severe drought of 1935-1936 caused very heavy losses.

Most of the livestock are owned and kept by the natives, whose methods are primitive and unscientific in the extreme. No care is given to breeding, and even elementary rules of hygiene are ignored. Little attention is given to the provision of shelter or to the storage of fodder. Experience has shown that selection is more satisfactory than cross-breeding, that is, it is better to improve the native breeds than to introduce new types. Determined efforts are being made, especially by European colonists, to improve the breeds, but only limited success has so far been achieved.

The best flocks and herds in the country are those on the pastures of the northern Tell. These pastures also support stock from central Tunisia when a dry winter causes a shortage of pasture and leads to a movement of stock to the north in March and April along traditional routes, determined by natural routeways and the presence of pasture. The extent of the movement varies according to the rainfall in central Tunisia. Thus in 1927, a dry year, 10,000 stock and more than 1,000 herdsmen moved into the caidat of Béja, about three times the normal number, but in the following year there was a migration of only a few hundred animals after a spring with ample rainfall.

The export of livestock is very small compared with the trade of former years, particularly that of the War of 1914-1918 (p. 352).

Large producers like the U.S.A., besides the neighbouring countries of north Africa, are keen competitors, and transport costs are high; trade with metropolitan France has also been adversely affected by stringent veterinary regulations.

Sheep (Fig. 61). The number of sheep in Tunisia has increased from little over a million in 1904 to 3,382,894 in 1937. Sheep-rearing

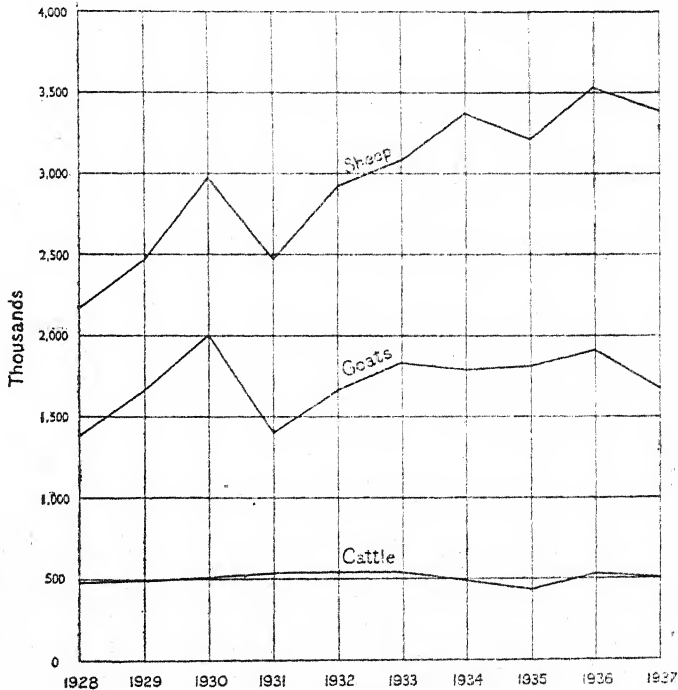


FIG. 60. *Number of livestock, 1928-1937*

has always been the leading occupation of the people of the steppes, but it is less important in the cereal- and olive-producing districts of northern Tunisia and the Sahel. In 1937 the regions of Sousse (1,352,000) and Sfax (893,000) accounted for two-thirds of the sheep in the country: the regions of le Kef, Bizerta, and Tunis had 516,000, 293,000, and 237,000 sheep respectively, and there were nearly 89,000 in the Territoires militaires du Sud. About 90 per cent. of the sheep are owned by the natives.

The quality and amount of pasture available vary with the seasons. In the winter some of the sheep in the north are moved south to avoid

the rains: the sheep of the Béja region, for example, are taken to the southern High Tell and the steppes, and those of Bizerta to

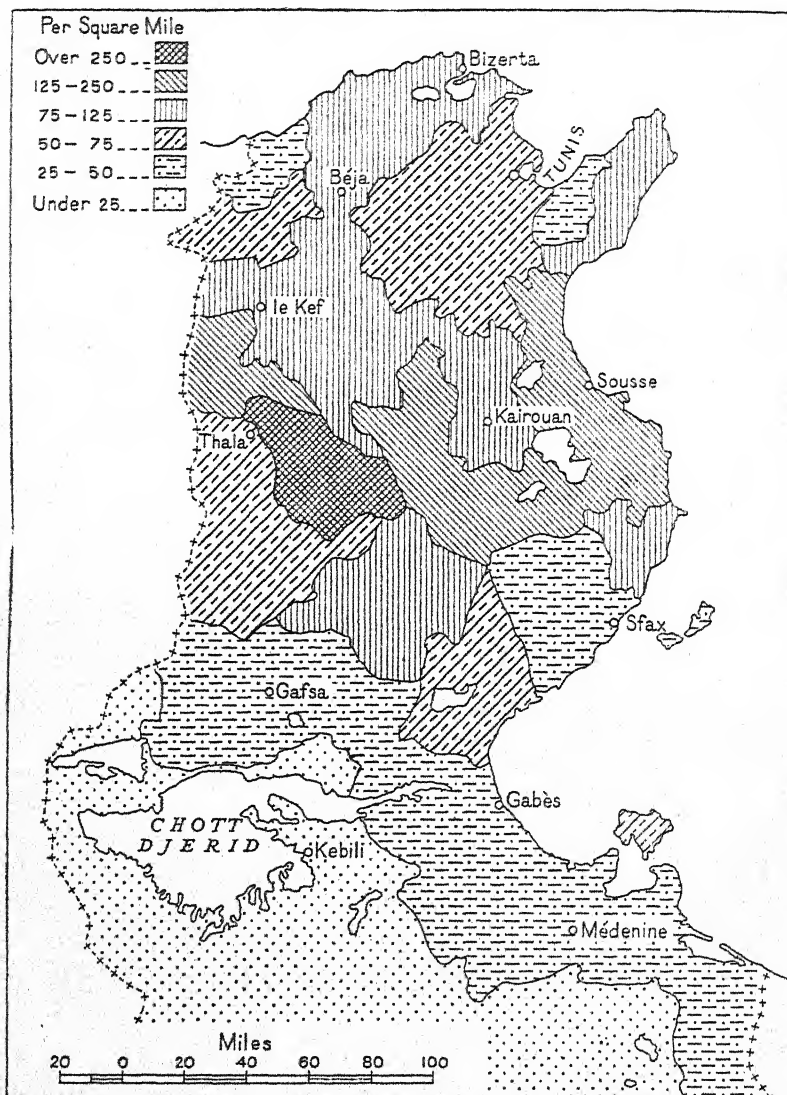


FIG. 61. *The distribution of sheep*

the Kairouan district. This migration is known as *tegbil*, and the reverse movement to the mountains and the north during the

summer as the *friguia*. The movement of flocks is much less extensive than formerly.

Almost the only type of sheep is the fat-tailed *barbarin* sheep, except in the west, where Algerian types are reared. Its thick, fleshy tail forms a reserve of food comparable with the camel's hump. It produces good meat and milk and fairly good, though coarse, wool, and the fat in its tail is valued by the natives. European colonists prefer Algerian types of short-tailed sheep, which are well suited to hilly country, produce better meat and wool, and generally command a better price in both the local and foreign market. These types are also being reared increasingly by the natives.

There is little foreign trade in meat, but some trade in live sheep: in 1938, 65,159 were exported, mainly to Libya, and 78,279 imported from Algeria. Trade with metropolitan France, formerly Tunisia's best customer, has declined because of competition and the heavy cost of transport. The production of wool fluctuates greatly from year to year, for several reasons, the chief being the high mortality of sheep in times of drought, the hoarding of wool by the natives, who are reluctant to sell except to cover immediate needs, and the lack of organization. Most of the wool is used in the country. The balance is exported, either in grease or washed. Exports in 1938 amounted to 440 tons in grease, sent mainly to France and Libya, and 464 tons of washed wool, most of which went to France.

Goats. The number of goats has increased from 575,000 in 1904 to 1,672,352 in 1937, when the majority were in the region of Sousse and Sfax, particularly in the steppe lands of the caidats of Sbeitla, Zlass, and Hammama. Goats also abound in mountain and forest areas, as in the caidats of Souk el Arba, le Kef, and Zaghuan. They are less common than sheep in districts producing cereals, olives, and fruit, because they are so destructive. Nearly all of them belong to the natives, who keep them for their milk, meat, skins, and hair, which is used for the making of clothes and carpets.

The trade in live goats fluctuates considerably from year to year. Imports, mainly from Algeria, totalled only 5,002 goats in 1937 and 24,598 in 1938: most of the goats exported in the same years, 46,792 and 31,650 respectively, went to Libya. About 300,000 skins are produced each year: some are exported and some used in native industries. Goat-hair is exported mainly to the United Kingdom and the U.S.A.

Cattle. The cattle of Tunisia are small and hardy, and similar to the Guelma breed of Algeria. They are generally good meat producers,

but poor producers of milk owing to the inadequacy of green food. As they need plenty of food and water, cattle are reared mainly in the plains of the north, where most peasants own a cow and a pair of oxen, and in the Sahel; south of the Dorsale they are difficult to rear, though there is an increasing number in the steppes despite the poverty of the pasture. Since 1904 their numbers have increased from about 184,000 to 507,302 in 1937. Of this total, 181,289 were in the region of Bizerta, especially in the caidats of Mateur, Béja, and Souk el Arba. Cattle are also numerous around Tunis and in the caidats of Nabeul and le Kef.

There is a small export of live cattle. In 1937, 14,576, valued at over 6 million francs, were exported, principally to Algeria, though some went to France, Malta, and Libya: in 1938 only 894 were exported. Imports of cattle vary considerably: in 1937 only 533 were imported, but in 1938, 5,030 came into the country from Algeria and France. About 80,000 cattle hides are produced each year and used in native industries: a few are exported to France and Italy.

Horses. In 1937 there were 109,787 horses in Tunisia, more than half of them in the regions of Bizerta, le Kef, and Sousse. The Barbary horse, the principal breed in Tunisia, is excellent for riding and draught purposes, and there is a particularly fine type in the Low Steppes. With the disappearance of tribal warfare and the development of motor transport, this horse is less widely bred, but fine horses are still to be seen on the race-courses of Tunis, Sousse, Sfax, and Kairouan, and certain tribes, notably the Zlass and the Souassi, remain splendid horsemen. The mule is preferred to the horse in the Sahel because it is less costly to feed: such horses as are used are no longer bought from the Low Steppes but from Souk Ahras in eastern Algeria. The Barbary horse is often crossed with the Arab horse, which is an almost perfect type.

Mules. There were 56,615 mules in 1937, particularly around Tunis, Sousse, Medjez el Bab, and le Kef. Their numbers are increasing in most districts, because they are easier to feed than horses and can be used for all purposes. They need grain, but can also be fed on poor pasture and plants with woody stems. Though small, they are very strong and work well even in great heat.

Asses. In 1937 there were 156,554 asses in Tunisia, widely distributed throughout the country. In the Sahel all but the poorest families own an ass, which is used for all purposes. Asses are usually small, though when well fed they can grow to a fair size; they are often badly treated and overloaded. The best beasts come from the

Sfax, Moknine, and Djemmal districts. Asses are reared chiefly for use within the country, but some are exported (4,302 in 1938), mainly to Libya.

Camels. The camel is the animal of the steppes and the Sahara: its numbers are declining with the development of motor transport. In 1937 there were 144,762 camels, nearly all of them native-owned: all but 10,000 of them were south of the Dorsale in the regions of Sousse and Sfax and in the Territoires militaires du Sud. In many parts of the country the camel is the only beast of burden, and the only animal that can cross the fords between the Îles Kerkenna or use the pastures of the Île Kneiss. In the Sahel, especially around Sfax, the people prefer mules to camels for ploughing, because browsing camels damage the trees unless muzzled. There is a small trade in live camels: about 5,000 went to Libya in 1937, and 2,000 were brought in from Algeria. Camel-hair is exported, mainly to the United Kingdom and the U.S.A.

Pigs. Pigs are reared exclusively by Europeans and are almost entirely confined to northern Tunisia. Of the total of 29,247 in 1937, there were 19,056 in the region of Bizerta and over 4,000 in each of the regions of le Kef and Tunis. In 1937 and 1938, 8,893 and 4,723 live pigs respectively were exported, principally to Algeria.

In the forests of the north, pigs, described as a cross between the domestic pig and the wild boar, are owned by the natives, but allowed to run wild in the forests.

Poultry. Most native families own a few chickens, but they are of poor quality and produce only small eggs. There is a small export trade to France in eggs and live poultry (42 and 7 tons respectively in 1938). Turkeys and guinea-fowl are also kept by the natives.

Bees. There are about 230,000 hives in northern and central Tunisia. The annual production of honey is about 1,500 tons and of beeswax 120 tons.

FORESTRY

THE forests of Tunisia have been described in general in Chapter V. The country has been greatly denuded of its trees by the depredations of centuries, and to-day the only extensive forests are in the mountainous north-west and in the Dorsale. All the forests are state owned and in 1937 covered an area of nearly 3,900 square miles (995,700 hectares), or about 8 per cent. of the total area of the country, including 842 square miles (215,480 hectares) of enclosed

forests, compared with 2,400 square miles (615,200 hectares) under public administration at the time of the French occupation of Tunisia in 1881. The Government, recognizing the economic importance of forests, has undertaken some reafforestation, and is attempting to combat the ravages of forest fires and of pasturing in forest areas. Much useful work has been accomplished by the forestry service created in 1884.

North of the Oued Medjerda the main forests are cork oak and Portuguese or zen oak: the finest and thickest are those of the Kroumirie, which cover a continuous area of nearly 500 square miles (120,000 hectares). Between the Medjerda and the Dorsale the principal trees are Aleppo pine and holm oak. Farther south the forests are generally small and open, and consist principally of wild olives and red juniper. In the Bled Talha, north-west of the Sebkhia en Noual, is a forest of gum-trees (*Acacia tortilis*). The distribution of forests is illustrated in Figs. 26 and 55.

Cork Oak. Cork oak (Arabic *fernane*) grows extensively in northern Tunisia, particularly north of the Medjerda valley, and cork is the main commercial forest product. Sometimes it occurs with Portuguese oak and occasionally, mainly in the eastern Kroumirie, with maritime pine. It grows best on sandstone soils, but in places occurs in limestone areas, as may be noted by names such as Fernana and Djebel Fernane in the southern Mogods. Altogether it covers about 550 square miles (140,000 hectares) in northern Tunisia, distributed as follows:

	Pure cork oak (hectares)	Cork oak and zen oak (hectares)	Cork oak and maritime pine (hectares)
Western Kroumirie . .	10,505	12,819	..
Eastern Kroumirie . .	30,075	32,300	5,455
Western Mogods . .	13,000	2,066	..
Central and eastern Mogods	33,380	..	..

Some of the finest forests are in the Kroumirie near Tabarka, Ain Draham, and el Feidj (Photos. 2, 73). The trees are commonly 30 or 40 feet high and sometimes reach 60 feet. The stripping of the bark begins towards the end of May, that is, about three weeks sooner than in France; in Tunisia there is no particular age at which trees are stripped for the first time. Trees that are of no use for cork provide tannin: such trees are marked and sold in April, and the bark is collected in June, July, and the first half of August. The timber of the cork oak is also used, although it decays quickly, and the branches make good charcoal or firewood. Little cork is manu-

factured in the country, most of it being exported in a raw state, principally to Algerian factories and to the U.S.A. Tabarka is the main port concerned in the trade. In 1938, 5,817 tons valued at 5.3 million francs were exported, 3,329 tons to Algeria, 1,455 tons to the U.S.A., and the bulk of the remainder to France.

Other Oaks. Portuguese or zen oak is the most widespread and commercially valuable of the other oaks (Photo. 76). It flourishes on cold northward-facing slopes and in damp, low-lying areas such as the valleys of the Oueds Bélif and Zéen, to which it has given its name. In northern Tunisia it occupies about half of the forested area of the western Kroumirie and a quarter of that of the eastern Kroumirie, often in association with the cork oak: it also occurs in the western Mogods, but farther east is rare: its timber is exported for use as railway sleepers, telegraph poles, and pit-props. The tannin obtained from the Portuguese oak is inferior to that of the cork oak.

The holm or evergreen oak, found mainly in the Aleppo-pine forest areas south of the Medjerda valley in the High Tell, provides pit-props, tannin, charcoal, and firewood. Similar use is made of the kermes oak, of which scattered stands occur in the forests of the north-eastern Dorsale and in the Cap Bon peninsula.

Most of the tannin obtained from the various oaks, including the cork oak, is exported through Tabarka or the Algerian port of Bône. It is used mainly in Algeria and Egypt, though in normal times Italy purchases much of the cork-oak tannin. In 1937 the total export of tannin amounted to 214 tons valued at 214,000 francs, and in 1938 to 85 tons valued at 119,000 francs.

Aleppo Pine. Aleppo pine is dominant in the large forested areas of the High Tell and the Dorsale, growing on many different types of soils and at all altitudes, but particularly on limestones where the rainfall is insufficient for other trees. South of the Dorsale it often forms open forest with alfa growing beneath the trees. Altogether the tree covers some 1,700 square miles (435,000 hectares). The best specimens reach a height of 50 or 60 feet. The timber is used principally for railway sleepers, telegraph poles, and pit-props, and also for general purposes.

Other Trees. The Kroumirie forests include many trees such as ash, elm, poplar, alder, and willow, together with trees like the chestnut, wild cherry, and apple, which do not occur elsewhere in the country, and bushes such as the lentisk, holly, and arbutus. Lentisk leaves give tannin, which is exported to Italy, the United Kingdom, and elsewhere, and the timber makes good firewood. The maritime

pine is a common tree between the Kroumirie and the coast, especially around Tabarka and on the dunes of Mekna: it is used mainly for pit-props and telegraph poles.

Thuya woods occur in the Dorsale near Zaghouan and farther north-east towards Grombalia and Nabeul: thuya is a valuable timber, and tar is obtained from it. Juniper, which occurs mainly in Aleppo-pine forests, has similar uses. The gum-trees of the Bled Talha, now much less extensive than formerly, partly because of the ravages of stock pastured in the district, provide the only cabinet wood in Tunisia (Photo. 79). Sumachs, found in the alfa region around Gafsa in association with junipers, are used for tannin, of which small quantities are exported.

CHAPTER XIII

MINING, INDUSTRY, AND POWER

MINING

THE mining industry holds an important position in the economic life of Tunisia. Mineral products normally account for between one-fifth and one-third of the country's export trade, and for many years the annual output of minerals was of greater value than that of any other of the French overseas territories. Recently this supremacy has been challenged successfully by French Morocco and Algeria, but before the present war Tunisia still accounted for more than one-fifth of the mineral production of the French Empire, although occupying less than one-hundredth of its total area. Since 1892 phosphate, iron ore, lead, and zinc have been produced to a value of about 5,000 million francs.

The phosphate trade, to-day the most important section of Tunisia's mineral industry, has been introduced since the French occupation, but other mining activities have been carried on in the country since early times. Numerous mines and quarries were in existence during the Carthaginian era, and a marked development took place under Roman rule. Classical workings have been encountered in a great many modern mines—in the iron mines of the Nefzas and the Monts de Tébessa, for example, and in the lead mines of Djebel Ressay, Djebel Hallouf and Sidi bou Aouane, Sakiet Sidi Youssef, and many others. Along the Algerian frontier accumulations of lead slags of Phoenician and Roman origin were until recently so abundant that a modern smelting-works was set up for the recovery of the lead they still contained. Ancient stone quarries, supplying building stone, marble, onyx, lime, and gypsum, are widespread. Among these the rocks of Chemtou, near Ghardimaou, yielded the yellow and pink 'Numidian' marbles much used in the building of Imperial Rome; the quarries of Keddel, near Soliman, have provided building stone for the town of Tunis since earliest times; and the galleries of el Haouaria near Cap Bon formed the source of much of the stone of Carthage. From the fifth to the eighth centuries A.D. exploitation of some mines and quarries continued under Byzantine domination; but throughout the Middle Ages, and indeed up to the

late nineteenth century, the mineral resources of the country lay untapped. In 1881 only two important mineral concessions, the lead-zinc mines of Djebba and Djebel Ressas, were in active production.

The absence of vegetation from nearly one-third of the surface of the country greatly facilitates exploration for mineral veins, and conditions at the end of last century were especially advantageous to the small prospector. Since 1893 the French authorities have issued an average of about 350 *permis de recherche* per year, the maximum number in any one year being 1,812 in 1903. The result is that the territory has been better prospected than any other country of comparable size in the French Empire. As in most colonies where mining is an important occupation, the industry has passed through two phases. First came a period of exploration and minor exploitation when the absence of communications necessarily limited working to products of relatively high value, principally the ores of lead and zinc with accessory copper and manganese. Iron ore could be mined only where close to the coast, and the intensive quarrying of phosphate in southern Tunisia, begun in 1899, was undertaken in the face of considerable difficulties. This phase came to an end as railways were constructed, and before the outbreak of war in 1914 the important iron-ore mines in the Djerissa and Douaria districts had been opened up, exporting their produce over the recently laid railway lines to Tunis and Bizerta. Rapid development of the iron-ore and phosphate deposits followed, the value of these products now greatly exceeding that of the less bulky ores: this is illustrated by the production figures for selected years given below. In these tables, as throughout the volume, tonnage is given in metric tons.

Principal Minerals exported from Tunisia, 1892-1938

	Lead ore ¹		Zinc ore ¹		Iron ore		Phosphate	
	Weight (tons)	Value (francs)	Weight (tons)	Value (francs)	Weight (tons)	Value (francs)	Weight (tons)	Value (francs)
1892	200	17,000	2,300	310,000	..	..	..	..
1900	6,300	970,000	22,200	2,664,000	..	..	171,000	3,800,000
1910	37,000	4,390,000	32,500	5,310,000	366,000	4,000,000	1,290,000	27,000,000
1920	24,700	17,338,000	12,500	4,087,000	406,000	16,251,000	1,482,000	75,000,000
1930	27,500	21,500,000	1,800	500,000	750,000	53,000,000	2,643,000	210,000,000
1938	26,780	64,100,000	1,000	212,000	802,542	107,100,000	1,591,276	132,600,000

¹ Including ore smelted in Tunisia.

The approximate aggregate value of the principal minerals produced between 1892 and 1938 is as follows:

Aggregate Value of Mineral Production, 1892-1938

	Weight (tons)	Value (million francs)
Lead ore . . .	1,089,000	592
Zinc ore . . .	763,000	150
Iron ore . . .	17,735,000	900
Manganese ore . . .	26,000	3
Copper ore . . .	5,000	4
Lignite . . .	176,000	12
Phosphate . . .	60,321,000	3,355
TOTAL. . . .	80,115,000	5,016

The available production and export figures for 1937, 1938, and the first six months of 1939 are given in the table below.

Production and Export of Minerals, 1937-1939

Mineral	Production (tons)			Exports (tons)		
	1937	1938	1939 ¹	1937	1938	1939 ¹
Phosphate . . .	1,771,400	1,934,200	899,650	1,927,800	1,591,276	972,418
Iron ore . . .	943,760	821,630	444,200	974,460	802,542	413,539
Lead ore . . .	21,550	28,800	15,590	1,810	6,267	1,964
Lead (production of metal)	24,816	23,790	14,200	26,720	20,513	12,399
Zinc ore . . .	2,570	1,414	565	3,990	1,045	215
Mercury (metal content).	0.9	9.3	..	0.9	6.0	..
Fluor spar . . .	1,680	2,060	1,440	660	410	550
Salt . . .	129,708	129,281	..	145,793	93,552	..

¹ First six months of 1939 only.

The contribution of the mines to the budget of Tunisia, through royalties and concession and other fees, amounts in normal years to about 15 million francs. From 1899 to 1939 the funds received by the State from this source totalled about 280 million francs. These figures are exclusive of a 25 per cent. tax on the cost of freightage of all consignments of minerals and mining plant conveyed over the Government-owned railways.

Labour. Statistics of the labour employed in mining during 1938 are given in the following table:

Minerals	Mining concessions	Mines exploited	Number of workmen	Man-days of work	Production (tons)	Value (francs)
Iron ore . . .	9	7	2,528	688,642	827,826	108,000,000
Lead . . .	51	31	4,679	1,220,719	31,590	30,000,000
Zinc . . .					1,412	500,000
Mercury . . .					9.3	1,650,000
Fluor spar . . .					2,043	1,900,000
Lignite . . .	2	..	..	..	..	..
Phosphate . . .	..	8	5,816	1,617,416	2,034,000	274,600,000

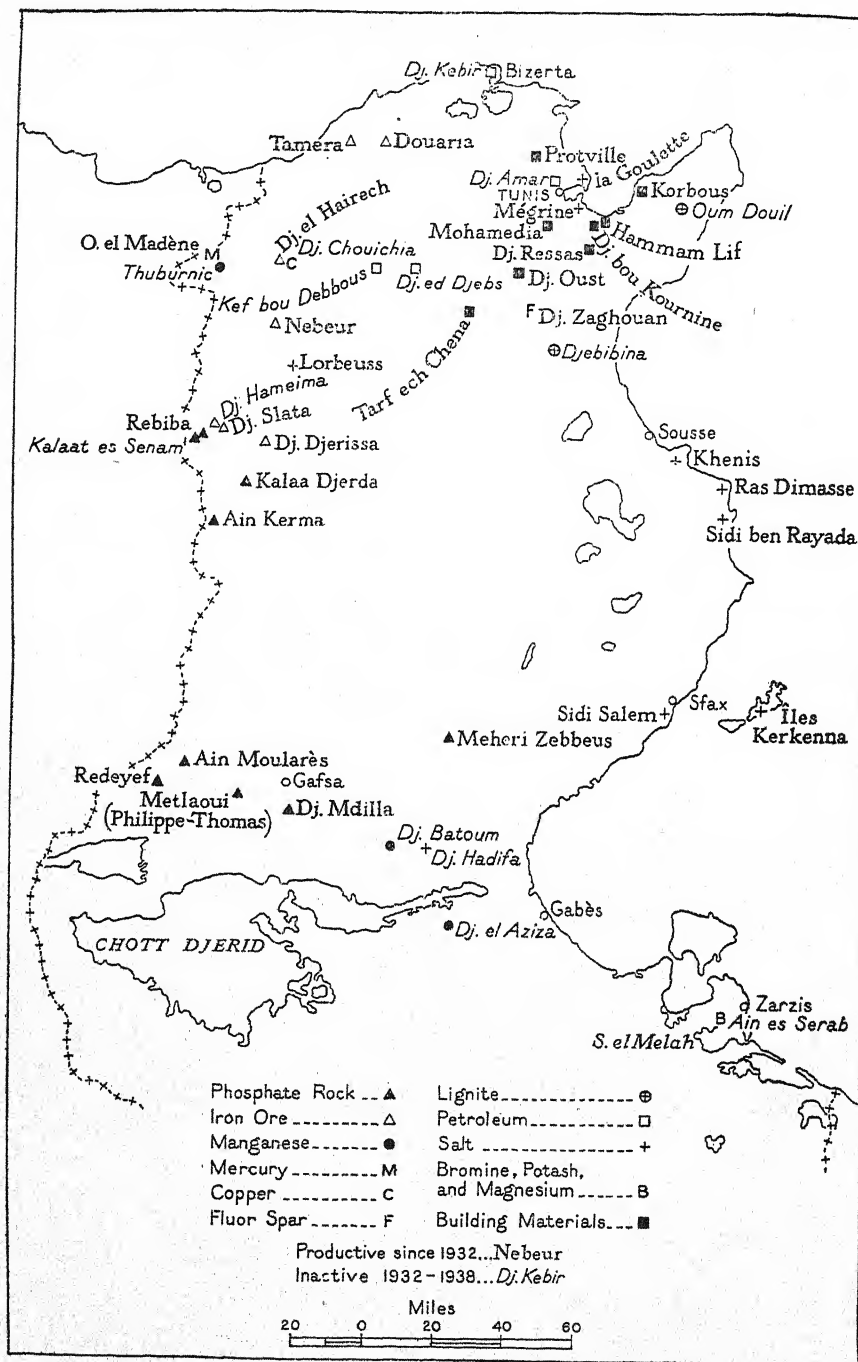


FIG. 62. The location of principal mines and quarries (excluding lead, zinc, and silver mines)

No recent data are available of the nationalities of the workmen. In 1930 the labour supply was classified as follows:

	<i>Europeans</i>			<i>Natives</i>				
	<i>French</i>	<i>Italians</i>	<i>Others</i>	<i>Tunisians</i>	<i>Algerians</i>	<i>Moroccans</i>	<i>Tripoli- tans</i>	<i>'Soufis'</i> ¹
Metalliferous mines	280	1,030	80	6,300	400	150	220	..
Phosphate mines	220	700	120	4,700	1,100	300	1,000	1,400
TOTAL	500	1,730	200	11,000	1,500	450	1,220	1,400
	2,430			15,570				

¹ Souafa (sing. Soufi) are people from the Souf oases in Algeria.

Figs. 62 and 66 show the approximate location of many of the places named in this chapter.

Phosphate Rock

The production of phosphate rock is by far the most important branch of Tunisia's mineral industry, the value of phosphate produced greatly exceeding that of the output of all other minerals together. The country is the leading exporter of phosphate rock in the world, and as a producer it ranks third after the U.S.A. and the U.S.S.R., with an output forming between 13 and 14 per cent. of the world production.

All the phosphate comes from a well-developed geological horizon at the base of the Lower Eocene, which outcrops extensively in the Gafsa region in the south, not far from the borders of the Sahara, and over lesser areas in the Monts de Tébessa of west-central Tunisia, astride the Algerian frontier. The frequent presence of fossil fish-bones, coprolites, and sharks' teeth points to the origin of the deposits from skeletal organic remains which accumulated on the sea-floor, followed possibly by concentration through the leaching away of associated limestone once the beds were raised to dry land. Reserves are almost inexhaustible, amounting to several thousand million tons. Production first began in 1899, in the Gafsa district, with an output of 70,000 tons; in 1905-1906 this was supplemented by the first shipments from west-central Tunisia, and by 1907 the country was producing a million tons of phosphate a year. In 1912 the output rose to 2 million tons, and although production declined during the War of 1914-1918, by 1922 it had completely recovered and in 1927 reached 3 million tons. Since 1932 the output has fallen to between 1.5 and 2 million tons, the decline being due not only to world economic conditions but also to strong competition from the

richer deposits of French Morocco. The fluctuations in the export of phosphate rock from the French North African territories since 1900 is illustrated in Fig. 63, and the destinations of the exports since 1929 in Fig. 64.

The commercial value of phosphate deposits depends upon their content of tricalcium phosphate ($\text{Ca}_3(\text{PO}_4)_2$), known to the trade as BPL or bone phosphate of lime—a reminder of the days when bones were the chief source of phosphorus and its compounds. North

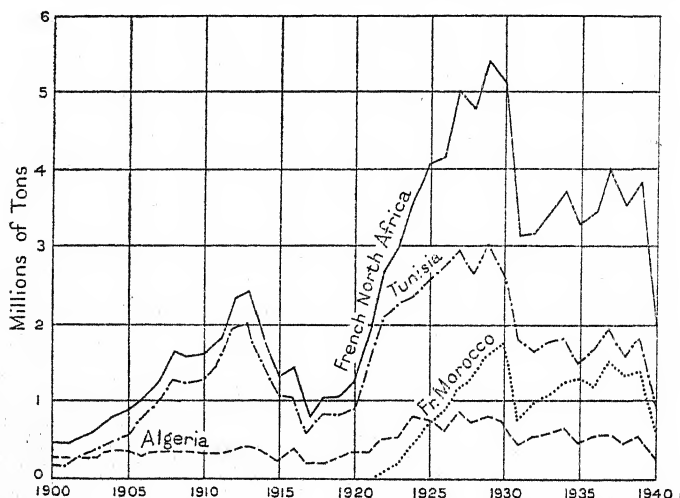


FIG. 63. *The export of phosphate rock from French North Africa, 1900-1940*

African phosphates are only economically workable where the BPL content exceeds 58 per cent.; but whereas the best Moroccan phosphate ranges from 70 to 78 per cent., the beds worked in Tunisia and Algeria only contain 58 to 66 per cent. and are of correspondingly lower value. Consequently much attention has been given to methods of concentrating those obtained in Tunisia and Algeria; and as most of the finer and lighter dust obtained on drying and crushing the rock is relatively poor in phosphate, enrichment may be accomplished by air elutriation or flotation, enabling the residual product to be sold in three grades—58/63, 63/68, and 65/70 per cent. BPL. In 1938 the leading producers initiated the Société Tunisienne d'Études de Coopération et de Défense de l'Industrie phosphatière, to promote research on the enrichment of Tunisian phosphate and to study new uses and markets. The cartel known as the Comptoir des Phosphates d'Algérie et de Tunisie forms a sales agency, responsible for

price control and distribution of demand. Because of the lack of fuel and of sulphuric acid no attempt has yet been made to prepare superphosphate for export, but a small plant at el Afrane, near Tunis, yields about 50,000 tons a year, for consumption within Tunisia. Of recent years some firms have specialized in the production of very finely ground phosphate for admixture with compound fertilizers.

Of the 1,591,276 tons of phosphate exported in 1938, 242,859 tons, valued at £285,826, were shipped to the United Kingdom, and 527,509 tons to France: other destinations included Italy, the Netherlands, Spain, and Belgium (Fig. 64). Tunisia supplies more than one-half of Britain's requirements of phosphate rock and about 60 per cent. of the French consumption.

Separate reference to each of the many deposits which have been discovered is impracticable, but some particulars of the various producing mines are given below.

The Gafsa Concession. The great phosphate concession of Gafsa covers an area of 170,000 acres, spread out along both flanks of the Seldja chain over a distance of some 45 miles, from the Algerian frontier to a point about 14 miles west of the Gafsa oasis. There is another concession, covering 35,000 acres, farther north, in the Ain Moularès district. Two beds are generally present and are most readily workable where the dip is at a low angle and the relief is cut by shallow ravines, permitting the easy driving of adits and galleries into the hill-slopes. The Compagnie des Phosphates et du Chemin de fer de Gafsa, which works these concessions at Metlaoui, Redeyef, and Ain Moularès, has the largest output of any phosphate-producing organization in the world, totalling 42 million tons to December 1938 (Photos. 186-188).

In the Metlaoui region, on the southern slopes of the hills, the productive strata are an upper seam of phosphate 9 feet thick and averaging 59 per cent. BPL and a lower seam 6 feet thick (62% BPL), the two being separated by 7 feet of marls. Working has been continuous since 1899. The centre of production at Redeyef is on the northern flank of the hills and has been worked since 1907; here the beds are thinner (4 to 6 feet) but appreciably richer (60-66%). At Ain Moularès, worked since 1922, the beds together reach 10 to 12 feet, with a foot-thick parting of marls, and are from 64 to 66 per cent. rich (Photo. 187). Mining is mainly by stoop-and-room methods. After drying in great rotary kilns or in the sun, which reduces the water content from 10 to 3 per cent., the phosphate is crushed and

graded, and then railed from Metlaoui and from Redeyef to Sfax (151 and 177 miles respectively) or from Ain Moularès to Sousse (190 miles). The combined production of the three mines during 1937 was 1,190,910 tons.

Djebel Mdilla. The deposit of Djebel Mdilla is part of a vast expanse of phosphate outcropping in the hills between Gafsa and the Chott el Fedjadj, the concession allocated to the Compagnie Tunisienne des Phosphates du Djebel Mdilla covering 5,500 acres. An

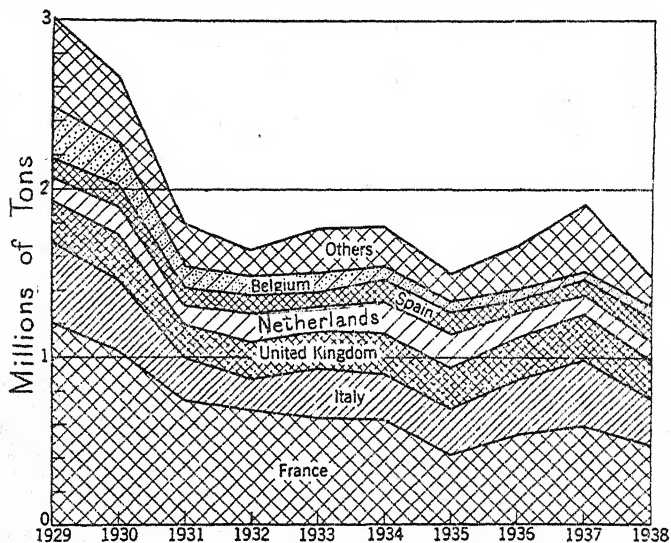


FIG. 64. *The destinations of exports of phosphate rock from Tunisia, 1929-1938*

upper bed is 5 to 7 and a lower about 3 feet thick. After extraction the phosphate is dried, concentrated to 66 per cent. BPL, and railed to Sfax (138 miles). Production began in 1922, and by the end of 1937 totalled 4,397,000 tons, with an output of 289,286 tons during 1937.

Meheri Zebbeus. This deposit, about 8 miles north of Maknassy station on the Gafsa-Sfax railway, was worked by the Société des Phosphates Tunisiens between 1920 and 1934. It yielded in all about 800,000 tons, which were exported from Sfax (82 miles by rail).

Kalaa Djerda. The deposit of Kalaa Djerda in central Tunisia, worked since 1905 by the Société des Phosphates Tunisiens, is at the

extreme north-eastern end of a syncline of which the south-western extremity forms the Algerian deposit of Djebel Kouif: the phosphatic beds in each case are in Eocene outliers capping the hill-tops. The seam which is mined ranges from 6 to 10 feet thick, with 58 to 63 per cent. BPL. The production is exported from Tunis (146 miles), and up to 1937 totalled about 8,600,000 tons. The output in 1937 was 212,857 tons.

Ain Kerma. To the south-west of Kalaa Djerda the detached outlier of Ain Kerma, on the Algerian frontier, has been worked by the Société des Phosphates de Constantine since 1934, with an annual production rising from 14,000 tons in that year to 20,936 tons in 1937.

Kalaat es Senam. The phosphate of the Kalaat es Senam plateau close to the Algerian frontier was worked by the British-owned Compagnie des Phosphates du Dir from 1906 to 1931, with a total production of about 2,460,000 tons. The seam of phosphate is from 6 to 10 feet thick and 58 to 63 per cent. rich. Export was by way of Tunis (158 miles).

Rebiba. About 1 mile north of Kalaat es Senam is the detached deposit of Rebiba, worked since 1912, principally by the Société de Saint Gobain, Chauny, et Cirey. Production to 1937 totalled 1,335,000 tons, with an output of 57,450 tons in that year.

Iron Ore

Deposits of iron ore are abundant throughout Tunisia, especially in the north and centre of the country, close to the Algerian frontier. Compared with the Algerian industry, however, where production began as early as 1865, the Tunisian iron-ore trade is of comparatively recent date. Concessions were granted in 1884 for the development of ore deposits in the Nefzas district, but the stringent conditions laid upon the concessionaires, requiring the construction of a railway to Tabarka, the establishment of export facilities at that port, and a minimum annual production of 50,000 tons of ore, were not fulfilled. In this northern region mining did not begin until the completion of the railway to Bizerta in 1913. In the more important field of west-central Tunisia there was no output until 1908, following the construction of a railway to Tunis.

Since 1908, 17 million tons of ore have been extracted; but although ore deposits are numerous and reserves extensive, occurrences of consistently high quality have proved to be rather sparse, and almost the whole of this output has hitherto come from four mines—

those of Djebels Djerissa and Slata in the Monts de Tébessa and those of Douaria and Tamera in the Nefzas district. By the end of 1937 the total production from these fields was as follows:

Mine	Tons
Djebel Djerissa	11,651,000
Douaria	2,677,000
Djebel Slata	1,524,000
Tamera	339,000

The output was 943,760 tons in 1937 and 821,630 tons in 1938 (Fig. 65). There is no iron-smelting industry in the country, and all the ores are exported. The United Kingdom normally takes about

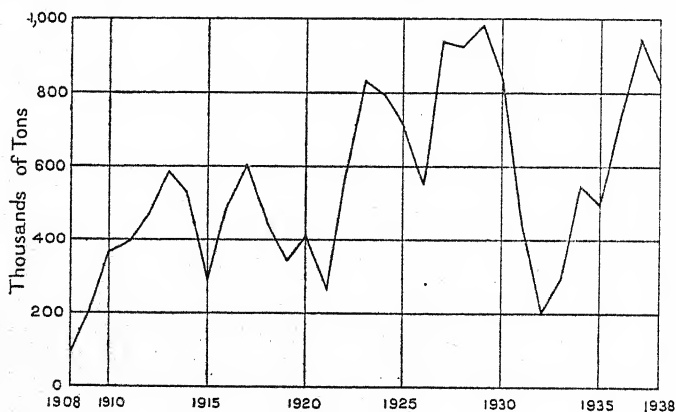


FIG. 65. The production of iron ore, 1908-1938

two-thirds of the production, its imports amounting to 730,167 tons, valued at £855,705, in 1937 and 470,227 tons, valued at £643,877, in 1938; normally Tunisia supplies about 10 per cent. of British imports of iron ore and is the fourth most important source of these, following Algeria, Sweden, and Spain. Only about 8 per cent. of the production is exported to France.

Djebel Djerissa. The Djebel Djerissa mine in the Monts de Tébessa, worked since 1908 by the Société des Mines de Djebel Djerissa, is by far the most important in Tunisia. The ore is a brown haematite, low in phosphorus and sulphur and bearing from 52 to 55 per cent. iron with from 2 to 3 per cent. manganese: it occurs in limestone of Cretaceous (Aptian) age. Mining is mainly open-cast, with visible reserves estimated in 1922 at 20 million tons. Considerable discoveries of ore have since been made, and to allow for expansion of the already extensive development, the capital of the company was

raised in 1939 from 13 to 33 million francs. Production was 603,000 tons in 1936 and 717,978 tons in 1937. The ore is railed from Djerissa to Tunis, 133 miles distant, where special handling facilities are available at the harbour of la Goulette (p. 246).

Djebel Slata. The concession of Djebel Slata, 12 miles west of Djerissa, is in Aptian limestones, the ore being a non-phosphoric haematite with from 52 to 53 per cent. iron and 3 per cent. manganese. It has been exploited since 1908, in open-cast and underground workings, by a Belgian company, the Société des Mines de fer de Djebel Slata et Djebel Hameima. The mine is contiguous to the important lead mines of Sidi Amor ben Salem (p. 323), and some parts of the deposit contain a lead mineralization, with galena yielding more than 1,000 grammes of silver to the ton. Production of iron ore was 35,000 tons in 1936 and 57,150 tons in 1937. The ore is exported through la Goulette (149 miles). An adjoining concession of the same company at Djebel Hameima is not yet worked.

Douaria. Mining of the Douaria deposit in the Nefzas district began in 1913, under the Société des Mines de fer de Douaria, and apart from a cessation of production in 1932 and 1933, it has continued ever since. The ore is a red and brown haematite, sometimes coarsely conglomeratic, which is of sedimentary origin, developed between horizons of gypseous marls and sandstones of Upper Eocene age; it contains 55 per cent. iron, 6 to 7.5 per cent. silica, 0.6 per cent. arsenic, and 0.3 per cent. phosphorus. Working is open-cast, in shelves 6 to 10 feet deep. The mine is linked to the station of Sedjenane, 2 miles distant, by a chain railway capable of delivering 180 to 200 tons per hour; thence it is railed to Bizerta (53 miles), where ore can be loaded at the rate of 500 tons per hour. The reserves at Douaria were estimated in 1922 at more than 6 million tons. The output in 1937 was 108,693 tons.

Tamera. The deposits of Tamera and other neighbouring concessions in the Nefzas district are owned by the Société des Mines de Tamera. Much was expected from these mines, but the presence of considerable arsenic in many of the haematites was for long an obstacle to their sale. A cable-way, half a mile long, links Tamera to the Tabarka-Bizerta railway. Save for a stoppage in 1935-1936 production has been continuous since 1925: the output in 1937 was 35,854 tons.

Djebel el Hairech. The mine of Djebel el Hairech in the Monts de la Medjerda west of Souk el Arba was worked by the Société de Houilles et Agglomérés between 1929 and 1931, yielding 50,000 tons

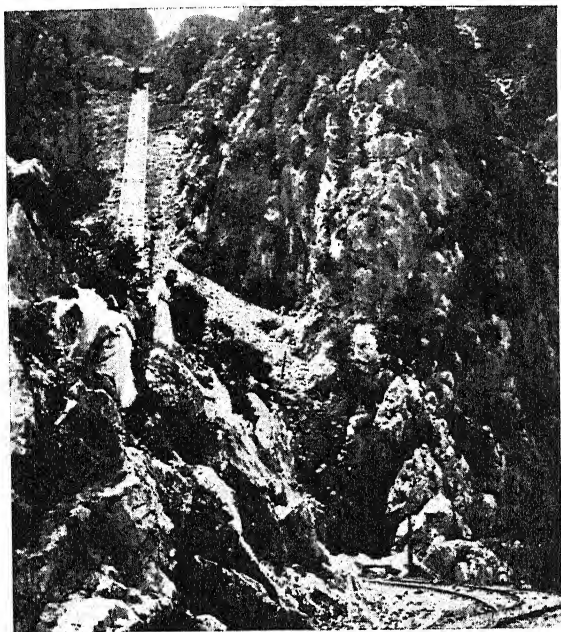
of haematite. The mineralization is in Cretaceous-Eocene sandstones and limestones, which also include here some occurrences of copper minerals and veins of titaniferous micaceous haematite. Production began again in 1937, with an output of 22,347 tons.

Nebeur. To the north of le Kef the iron-ore deposits of Nebeur, worked by the Société Nebeur, contain reserves of haematite estimated at 3.5 million tons. A railway was constructed to the mine in 1911-1912, branching off the Ghardimaou-Tunis line at Sidi Smail; but despite this, production has never been more than about 2,000 tons a year, probably because of the occurrence of the ore in small detached bodies and of the presence of considerable silica, with a little lead and zinc as further impurities. The haematite occurs in marly limestones of the Lower Cretaceous, at the contact with massive Triassic dolomites. In 1937, 426 tons were produced, giving a total production since 1930 of only 11,000 tons.

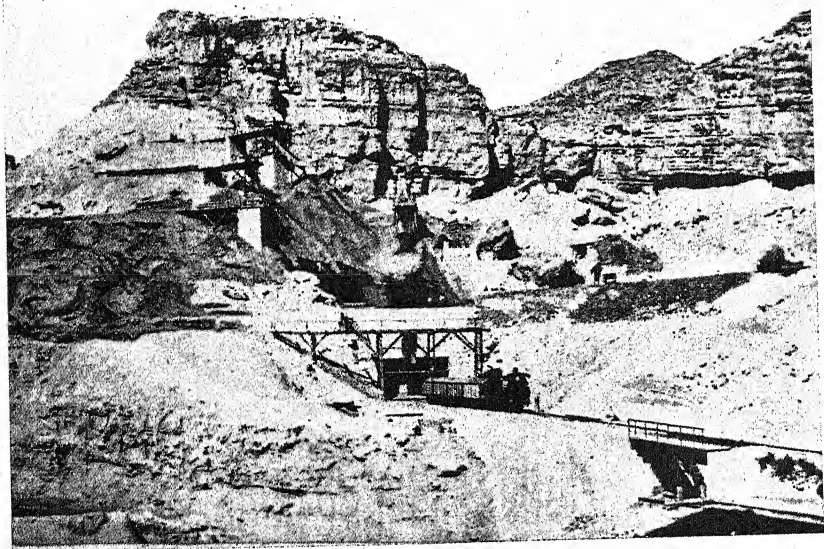
Lead and Zinc

Over fifty concessions for lead and zinc have been granted, almost all in northern Tunisia. Here, as elsewhere, the ores of these two metals are found in mutual association, though both may not be present in payable quantities. In the early days of the industry zinc was the more important export, but the output of this metal has lagged far behind that of lead since the War of 1914-1918. The mineral veins are widely dispersed, and are nearly always found cutting or replacing Triassic, Jurassic, or Cretaceous limestones; but like many other important lead and zinc fields, the mineralization cannot be related definitely to any phase of known igneous activity, and the mode of origin of the deposits is still debated.

Modern exploitation began in 1892, with a production of 175 tons of lead ore and 2,300 tons of zinc ore (60% concentrate in both cases). Development was rapid, production reaching a maximum of 59,500 tons of lead ore and 37,400 tons of zinc ore in 1913. Output fell markedly during the War of 1914-1918, but rose again to 39,200 and 14,000 tons of lead and zinc ore respectively in 1924. During the depression years production of lead ore fell from 32,000 tons in 1929 to 6,100 tons in 1933; zinc-ore production was 10,000 tons in 1929 and nil in 1933. Recovery has since been slow, but the production reached 28,800 tons of lead minerals and 1,414 tons of zinc ore in 1938. Although from 1893 to 1938 the total production from some thirty-six different worked deposits reached 1,089,000 tons and 763,000 tons of lead and zinc ore respectively, none of the occurrences



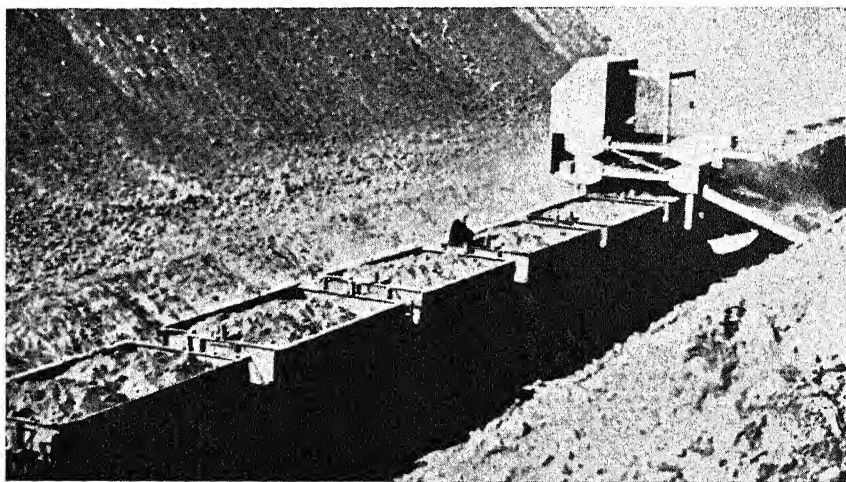
185. *Lead mine, Djebel Ressas*



186. *Phosphate mine, Gafsa concession*



187. *Phosphate mine, Ain Moularès*



188. *Phosphate mine, Metlaoui*

is individually of great size: the only mines which have produced over 75,000 tons (metal content) are the following:

	Lead (tons)	Zinc (tons)	Total (tons)
Djebel Ressas	99,000	148,000	247,000
Sidi Amor ben Salem	131,000	..	131,000
Khanguet Kef Tout	42,000	90,500	132,500
Sakiet Sidi Youssef	50,000	55,000	105,000
Djebel Hallouf	88,000	..	88,000
Djebel Trozza	84,000	2,000	86,000
Sidi Ahmed	23,000	60,000	83,000

The ores of Djebel Ressas, 18 miles south-east of Tunis, were worked by the Carthaginians and the Romans. Modern exploitation dates from 1868, and the mine is now about 1,000 feet deep: production ceased in 1928. Hemimorphite (zinc silicate) is the principal mineral, with blende (zinc sulphide) and galena (lead sulphide) in depth (Photo. 185). The zinc mines of Djebel Zaghouan, 30 miles south of Tunis, which produced 42,000 tons of ore (metal content) between 1894 and 1929, are also no longer active. Fluor spar is now worked here. Another group of workings lies to the north of the Medjerda valley, including particularly Djebel Hallouf, $7\frac{1}{2}$ miles north of Souk el Khemis, to-day the leading producer of lead in Tunisia; the ore zone is about 18 feet thick, in Upper Cretaceous limestone, and consists of rich cerussite (lead carbonate) with some galena and a little mimetite (chlor-arsenate of lead). The Sidi bou Aouane concession, a short distance to the south-east, has yielded 60,000 tons of lead since 1911. The production of Khanguet Kef Tout and Sidi Ahmed, north-north-west and north of Béja, has lately been small compared with the former output; the concession of Bazina, north-north-east of Béja, which yielded 55,000 tons of lead (metal content) to 1933, was inactive during the period 1934-1936.

North of the Monts de Tébessa, in the Algerian frontier zone, are the formerly important mines of Sakiet Sidi Youssef, 32 miles west of le Kef, which have been inactive since the economic depression. North-east of le Kef the Djebel et Touireuf concession produced 2,938 tons of lead ore in 1936 and 1,818 tons in 1937. The ancient mines of Sidi Amor ben Salem (near Tadjerouine), of which the modern workings date from 1908 and are 500 feet deep, have lately been the second producer of lead in the country (3,300 tons in 1937). The ore is a cerussite-galena in a complex barytic-calcareous-ferruginous gangue. The adjacent concession of Koudiat el Hamra has had an output of 40,000 tons since 1914 and is still producing.

The principal deposits to the south-east of the Monts de Tébessa are at Djebel Trozza, 30 miles west-south-west of Kairouan, which has yielded 84,000 tons of lead since 1907, and at the neighbouring mine of Djebel Touil, recently the largest zinc producer in Tunisia (2,630 tons in 1936).

The following is a statement of output for the latest years for which statistics are available. Names of mines are given in parentheses where not apparent from those of the mining companies. The location of concessions not mentioned otherwise is given in Fig. 66.

Production of Lead and Zinc Ores

<i>Company</i>	<i>Lead</i>		<i>Zinc</i>	
	<i>1936 (tons)</i>	<i>1937 (tons)</i>	<i>1936 (tons)</i>	<i>1937 (tons)</i>
Djebel Hallouf	3,358	3,940	..	..
Sidi bou Aouane	2,836	3,300	..	..
Guern Alfaya (Koudiat el Hamra) .	2,297	2,065	..	..
Les Mines réunies (Sidi Amor ben Salem)	1,284	2,019	..	..
Exploitation minière en Tunisie (Djebel et Touireuf)	2,983	1,818	..	..
Royale Asturienne (Djebel el Grefa) .	..	1,657	..	..
Bazina . . . . .	..	1,643	..	..
Syndicat du Trozza (Djebel Trozza) .	1,309	1,008	..	..
Vieille Montagne (Djebba) . . . . .	..	696	..	..
Permis d'exploitation (el Haouaria) .	..	675	..	..
Exploitation et Recherches minières en Afrique du Nord (Sidi et Taia) .	469	625	..	..
Sekarna (Djebel Sekarna)	224	390	255	126
Melaliss	576	351	..	..
Tabouna (Djebel Tabouna) . . . . .	..	302	..	..
Djebel Touil	850	240	2,630	1,516
Khanguet (Khanguet Kef Tout) . . .	..	133	..	531
Oued Kohol	191	121	..	..
Kef Chambi . . . . .	..	111	..	..
Various	403	460	..	400
	16,700	21,545	2,885	2,573

There are three smelters for the reduction of lead ores, and these treat not only the greater part of the home production but also from time to time smelt ores from Algeria, France, and Yugoslavia. The Tunisian ores are particularly easy to smelt because of the predominance of carbonate, the sulphur content of bulk shipments rarely exceeding 7 per cent. The largest of the smelters, that at Mégrine,

near Tunis, was built in 1909. The second, at Djebel Hallouf, treats the output of that mine, and in association with this a subsidiary company produces white lead, red lead, lead shot, and piping. The third smelter is at Bizerta and belongs to the Sidi bou Aouane mines.

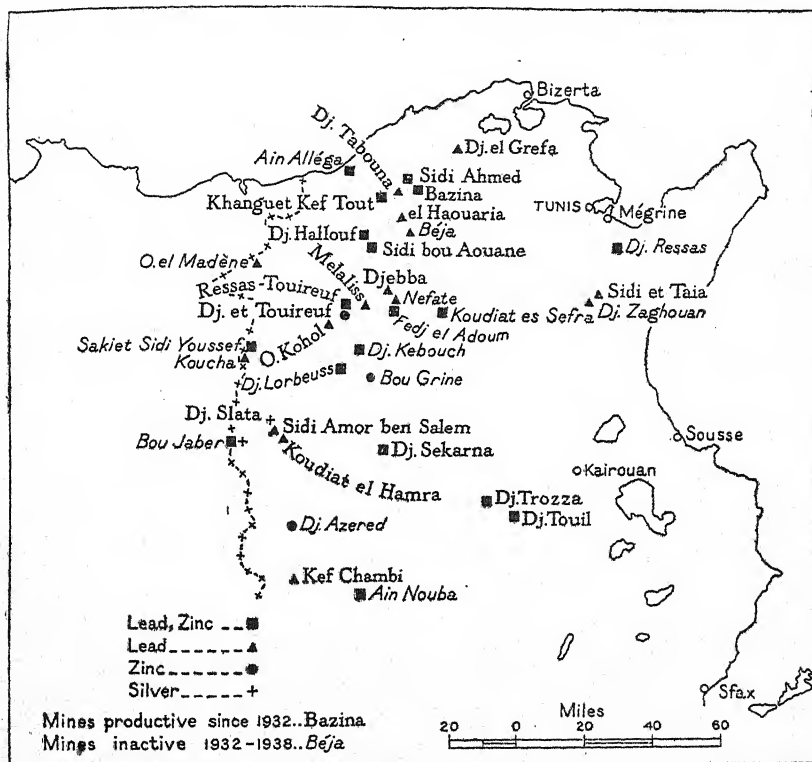


FIG. 66. The location of lead, zinc, and silver mines

The combined output of metallic lead products totalled 293,000 tons between 1924 and 1938. Production during recent years was as follows:

Smelter	1936 tons	1937 tons	1938 tons
Mégrine	17,890	22,149	23,790
Djebel Hallouf	2,176	1,791	
Bizerta	1,431	876	

A plant for the treatment of low-grade zinc ores has been built during recent years in the southern part of the city of Tunis.

Silver

Silver is produced as a by-product in the smelting of argentiferous galena, but in general the proportion in Tunisian lead ore is low, ranging from 10 to 400 grammes per ton. At Djebel Sлата and Bou Jaber exceptional contents of 1,500 grammes have been met with. The output, which fluctuates considerably from year to year, was 174,638 fine ounces in 1937 and 61,149 fine ounces in 1938.

Manganese

The mine of Thuburnic, in the Medjerda valley 7 miles north of Ghardimaou, was worked spasmodically for manganese between 1908 and 1929, and had an aggregate output of 25,000 tons of impure arsenical pyrolusite, most of which was shipped to Italy. The deposit is now practically exhausted. Other small concessions for manganese ore at Djebel Batoum, on the north side of the Chott el Fedjadj, and at Djebel el Aziza, 25 miles west of Gabès, have not yet been worked.

Mercury

Mercury was first produced in 1935, with an output of 0.8 ton of quicksilver, rising to 2.5 tons in 1936 and 9.3 tons in 1938. The source is a mine at Oued el Madène, 10 miles north of Ghardimaou: the ore is a cinnabar with a metal content of from 2.4 to 6.7 per cent.

Copper

Deposits of copper have been discovered at numerous places in the north-west, principally in the form of carbonates and as copper pyrites; but although all have been well prospected, only one deposit, that at Djebel Chouichia north-west of Souk el Arba, has hitherto proved workable. The ore is a cupriferous pyrite rich in arsenic and antimony. Between 1903 and 1909, when the mine closed down, 4,412 tons of matte and speiss were produced.

Fluor Spar

Since 1937 fluor spar has been produced from open workings on the southern side of Djebel Zaghouan, about 30 miles south of Tunis, by the Société minière Nord-Africain ('Somina'). Output for that year was 1,680 tons, increasing to 2,060 tons in 1938; 1,440 tons were produced during the first half of 1939. The ore, obtained by blasting, contains between 80 and 85 per cent. calcium fluoride, about two-thirds of the production being concentrated for export at 97-98 per

cent. and the remainder at 85-90 per cent. Exports have been principally to the U.S.A. and to Yugoslavia, the former receiving 600 tons of high or 'acid' grade spar in 1937, rising to 766 tons of acid grade and 654 tons of fluxing grade in 1938. The ore is transported by cart to the station of Moghrane, a distance of $7\frac{1}{2}$ miles, whence it is railed to Tunis (34 miles).

Coal and Lignite

Tunisia possesses no resources of solid fuel of high grade, the country's needs being met by annual imports of about a quarter of a million tons of coal, briquettes, and coke. The bulk of these imports comes from the United Kingdom, which supplied 175,350 tons and 187,950 tons in 1937 and 1938 respectively. The principal consumers are the public utility companies, especially the Compagnie fermière des Chemins de fer Tunisiens, the Compagnie des Phosphates et du Chemin de fer de Gafsa, the Compagnie des Tramways de Tunis, and the Compagnie du Gaz et des Eaux de Tunis. The main importing agencies are the Société Tunisienne de Houilles et Agglomérés at Bizerta, which produces a large tonnage of briquettes, and the Société commerciale Tunisienne, which imports through Tunis and Sfax.

A seam of lignite 1 to 2 feet thick occurs in the Tertiary strata of the Cap Bon peninsula, and was mined during the War of 1914-1918 near the village of Oum Douil. Altogether 174,249 tons were produced between 1916 and 1924, when the work was abandoned. The average composition of the lignite was: moisture 6 per cent., volatiles 32 per cent., ash 23 per cent., and fixed carbon 37 per cent., with sulphur 2 per cent. The calorific value was 5,500 to 6,000 calories (9,900 to 10,800 B.T.U.). A similar lignite occurs near Djebibina, where 1,445 tons were mined in 1917 and 1918.

Petroleum

Extensive prospecting has hitherto failed to yield oil supplies of economic significance, although seepages of bitumen and natural gas are present at several places. The geological structure, with many domes and anticlines, is generally favourable to the occurrence of petroleum. Since 1931 the Syndicat d'Études et de Recherches pétrolières en Tunisie, a state-controlled organization, has undertaken an intensive boring campaign, principally at Djebel ed Djebs (2 miles south-west of Slouguia in the Medjez el Bab district), Kef bou Debbous (7 miles north of Teboursouk), Djebel Amar (10 miles

north-west of Tunis), and Djebel Kebir (3 miles north-west of Bizerta); but all investigations have hitherto failed to yield more than traces of petroleum. The boring campaign is continuing.

In 1938, 13.8 million gallons of motor spirit and 6.6 million gallons of other petroleum products were imported, principally from Iraq, the U.S.A., Persia, and Roumania.

Salt

The sale of salt is a State monopoly, and production for home consumption is accordingly under Government control. Output has increased from 1,300 tons in 1903 to 121,000 tons in 1931 and 129,000 tons in 1938; of recent years exports have ranged from 60,000 to 145,000 tons. Coastal salt-pans, inland sebkhas or salt lakes, and saline springs are all worked, but the climate and configuration of the coast favour production from sea-water. One of the salt-pans, that at la Goulette, is worked for local needs by the Direction des Monopoles Tunisiens, and produces about 13,000 tons per year. Others worked for the export market by various private enterprises are at Mégrine (Tunis), Sidi Salem (Sfax), Khenis, Ras Dimasse, and Sidi ben Rayada, (all south-east of Sousse), and on the Îles Kerkenna. The production from chotts and sebkhas is now small, as is the controlled output (1,200 tons per year) from a saline spring at Lorbeuss, near le Kef. Visible reserves of 15 to 20 million tons of good quality rock salt (96% sodium chloride) are present in two seams, respectively 80 and 115 feet thick, in the Triassic rocks of Djebel Hadifa, on the northern side of the Chott el Fedjadj, 40 miles west-north-west of Gabès.

Bromine, Potash, and Magnesium

The waters of the many sebkhas and chotts of southern Tunisia and of the eastern plain form a potential source not only of salt, but also of bromine, potassium chloride, and magnesium chloride. Following the use of bromine compounds in gas warfare by the Germans in 1915, three factories for the production of this element were erected at Sfax, Mahdia, and Tunis; and from the spring of 1916 they formed the principal source of bromine available to the Allies, producing about 2.5 tons per day, with a total war-time output of 1,133 tons. The concentrates of salts from which the bromine was manufactured were derived from the Sebket el Melah, an expanse of crude brine of specific gravity 1.238, covering about 50 square miles close to the sea to the south-west of Zarzis.

Towards the end of the war works were also set up at Ain es Serab,

on the northern side of the Sebkret el Melah about 6 miles from Zarzis, for the extraction of potassium chloride from the saline waters; 2,144 tons of 'sebkhainite', a potassium-magnesium chloride akin to the crude carnallite of Stassfurt in Germany, were produced late in 1918. The capacity of the works at the armistice, when the factory was closed, was 150,000 tons of salt, 6,600 tons of 50 to 60 per cent. potassium chloride, and 300 tons of bromine per year. There has since been no production, although annual imports of potash salts range from 2,500 to 5,000 tons.

Building Materials

There are about 300 quarries in Tunisia engaged in the production of building stone, roadstone, cement, and other rock products of relatively low value. Most of these are situated near the main centres of population and depend entirely upon local trade. A little marble is produced for export from time to time.

The most recent production figures available are as follows:

	1921		1929	
	Tons	Value (francs)	Tons	Value (francs)
Dimension stone (soft) . .	16,855	215,200	10,780	323,400
Dimension stone (hard) . .	852	77,441	5,890	706,800
Rubble	218,050	640,290	271,400	2,171,200
Roadstone and ballast . .	273,609	1,686,312	408,738	6,131,070
Millstones	6	3,000	..	..
Sand and gravel	57,107	426,165	238,140	3,095,820
Foundry sand. . . . .	..	..	430	7,310
Hydraulic lime	30,150	3,015,000	78,300	1,174,500
Fat lime	14,745	718,961	40,310	604,750
Cement	250	45,000	..	..
Plaster	8,120	511,000	19,540	293,100
Brick and tile clays . .	12,708	137,000	97,150	971,500
Pottery clays	1,600	8,000	11,320	113,300
Paving stones	4,746	166,583	11,478	677,192
Marble and onyx . . .	180	35,200	138	145,682

Only a few of the larger quarries can be mentioned. Among these are the extensive workings at Djebel Kharrouba, close to Tunis, which have a face over half a mile long in pale, compact, Cretaceous limestones. Rough ashlar is the principal product, but paving and kerb stones, road macadam, and fine dimension stone are also produced. The quarries of Korbous on the Golfe de Tunis are in very hard Upper Eocene sandstone which is worked as setts, kerbs, and macadam for the principal roads. Gypsum for plaster, of which the

production in 1937 was 22,400 tons, comes mainly from a Triassic deposit at Djebel Ressas, 18 miles from Tunis and 2 miles from the station of la Laverie. These and many other quarry undertakings are controlled by the Tunisoise Industrielle.

Quarries worked for lime include those in Middle Cretaceous rocks at Djebel Djelloud near Tunis, which also yield building stone, ballast, and gravel; and those in Lower Cretaceous strata at Protville and in Jurassic rocks at Djebel bou Kournine and Hammam Lif, producing hydraulic lime, fat lime, and cement. The production of cement in 1937 was 56,400 tons, but slow-drying cements are imported from France to an extent of between 20,000 and 50,000 tons per year. Marble and onyx marble are produced at Tarf ech Chena near Bou Arada, Mohamedia, and Djebel Oust.

Other Minerals

Ores of antimony and arsenic are met with in many metalliferous mines, but hitherto they have not proved workable; a *permis de recherche* has, however, been issued for a small deposit of realgar and orpiment (arsenic sulphides) about 2 miles south of Ghardimaou. Vanadium minerals are present in small amounts in the lead mine of Djebba. Celestine (the sulphate of strontium) is found in many Upper Cretaceous marls in central and southern Tunisia, and the same mineral, with strontianite (strontium carbonate) and barytes, occurs frequently as gangue in mineral lodes. Thermal and mineral springs are widely distributed.

Note on Mining Legislation

Mines. All mineral deposits are the property of the State, and, as noted above (p. 313), the fees and royalties from mining companies constitute an important source of national revenue. By decrees of 1893 and 1913, modified by later legislation, deposits are divided, for administrative purposes, into the following five categories: (1) graphite, coal, and lignite; (2) asphalt, petroleum, &c.; (3) metallic ores, sulphur, and arsenic; (4) alum, borates, and associated salts; (5) nitrates, rock salt, potash, and associated salts. Workings for substances other than the above are administered not as mines but as quarries. To carry out prospecting for any one of the above groups of minerals it is necessary to obtain a *permis de recherche*, valid for three years and renewable, the fee being 250 francs for an area of 400 hectares (988 acres). A *permis d'exploitation* for the same area (fee 500 francs) may be obtained if the deposit is workable; this is valid

for five years and is non-renewable, but it gives the right of application for a *concession* (fee 1,000 francs). Taxes on the area covered by the *permis* or the *concession*, and royalties on the minerals extracted, have both varied from time to time, but in groups (3), (4), and (5) the former are generally from 0.5 to 1 franc per hectare and the latter 5 per cent. of the value of the output. In groups (1) and (2)—lignite and petroleum—taxes and royalties are higher to discourage speculative staking of claims, and the granting of such *permis* now requires special authorization. It is significant that although 528 *permis* in group (2) were granted between 1914 and 1930, exploration was carried out in six cases only.

Where the prospector or the concessionaire is not the owner of the surface and fails to enter into a mutually satisfactory arrangement with the latter, a tribunal of the Direction générale des Travaux publics may give the permission necessary to carry out the essential surface works, after fixing an indemnity to the landlord. The Service des Mines branch of this administration is responsible for periodical inspections of the mines to ensure that these conform to various regulations governing safety and public health.

Quarries. As in metropolitan France and in Algeria, phosphate is not included in the five categories of minerals listed in the mining decrees; and the anomalous situation arises that although the open-cast iron-ore workings are administered as mines, the underground phosphate mines are classified as quarries. Legally phosphate, with gypsum, building stone, and various other substances not specified in the mining legislation, is the property of the owner of the surface: but of the various important phosphate deposits which have been worked only those of Kalaa Djerda and Ain Kerma are in privately owned territory (*terrains privés*). All the extensive phosphate beds of southern Tunisia are in the state-controlled domain lands or *habus* where, by a decree of 1898, prospecting is prohibited without an *autorisation* from the Direction générale des Travaux publics. After detailed investigation by an approved prospector (to whom certain fees are reserved), a deposit may be leased as a concession by public auction, the State receiving an annual rent. In addition a tax of 0.50 francs per ton is payable on all phosphate marketed, whether produced from state-controlled lands or not.

Research. A decree of December 1938 authorized the State to take up shares in Tunisian mining companies, and also inaugurated the Société de Recherches et d'Études minières de Tunisie, with a capital of 12 million francs, half of which was to be furnished by the

principal mining companies and half by the State. The function of this new company is to undertake intensive researches into all types of mineral deposits, presumably in co-operation with the Service géologique and the Service des Mines.

INDUSTRY

General

Only a small proportion of the population of Tunisia is engaged in industry apart from mining. There is a large import of manufactured goods, but a negligible export of such goods. In 1938 manufactured goods accounted for 822.6 million francs of the total import trade of 1,560 million francs, and about 85 per cent. of these manufactures were supplied by metropolitan France and Algeria. French industrialists have, in fact, regarded Tunisia as a valuable market for their goods, and mining and agriculture rather than industry have attracted French capital to the country. Furthermore, the supplies of fuel and power and of other necessary resources are inadequate for the development of large-scale industry. During the German occupation of metropolitan France in the present war industrial production was stimulated, though such changes were only temporary and are not, therefore, considered in this chapter. Some of the old-established native industries have survived the influx of cheap imported manufactured goods and are briefly described on pp. 339-340. The tourist industry is discussed on p. 340.

Labour. One of the main obstacles to industrial development has been the shortage of skilled labour. Most skilled work is done by Europeans, especially the French. Unskilled labour is performed by the natives and by the lower-class Italians and other European communities. The formation of trade unions has been permitted since 1932. Labour legislation was modified considerably by the Popular Front Government established in France in 1936. A series of decrees during 1936 introduced legislation regarding the forty-hour week, paid holidays, and collective labour contracts: the forty-hour week for all branches of administration, industry, and commerce was finally applied, and paid holidays instituted, in June 1937. Other decrees were issued regarding public meetings, the press, trade unions, and disciplinary measures against natives. These reforms were not introduced without some unrest, and there were strikes in 1936 and 1937 (cf. p. 140). Conditions improved, however, in the months preceding the outbreak of war.

Milling

There are small native mills, usually of primitive construction, throughout Tunisia, because the natives generally make their own bread. About fifteen large flour-mills produce mainly for the European population: they employ about 500 persons. There are several large grain silos for the storage and grading of grain with a total capacity of 165,300 tons: that at Manouba near Tunis has a capacity of 50,000 tons, and is one of the largest in French North Africa; it is equipped for the classification and mixing of grain, and also for the preparation of seed corn. Other silos are at Mégrine near Tunis (capacity 12,000 tons), Bizerta and Souk el Khemis (each 6,000 tons), Mateur (5,000 tons), Bou Arada and el Akhouat (south of Teboursouk) (each 4,000 tons), Béja (3,300 tons), and Ousseltia (about 25 miles east of Maktar) (2,000 tons). Storage facilities elsewhere are adequate for a further 73,000 tons of grain.

There is an export of wheat flour, amounting in 1938 to 14,704 tons valued at 41.1 million francs, almost all of which was purchased by France. Most of the export of bran (19,636 tons in 1938) also went to France.

Spaghetti, Macaroni, &c.

There are about sixty small factories, employing about 200 persons, for the manufacture of spaghetti, macaroni, groats, and other food pastes. There is usually a small surplus for export, amounting in 1938 to 9,425 tons valued at 27.2 million francs, most of which went to France and Algeria.

Brewing and Distilling

In recent years only about 550,000 gallons (25,000 hectolitres) of beer of poor quality have been produced annually in Tunisia. The one brewery is in Tunis. Beer is imported in barrels and bottles. In 1938, 191,150 gallons (8,725 hectolitres) were imported in barrels, 182,116 gallons (8,278 hectolitres) of which came from France, and 34,958 gallons (1,589 hectolitres) in bottles, including 29,524 gallons (1,342 hectolitres) from Malta.

Alcohol is distilled from surplus or otherwise unsaleable wine. Production has varied between 220,000 gallons (10,000 hectolitres) in 1930 and 1,034,000 gallons (47,000 hectolitres) in 1935. Output in 1938 was 572,000 gallons (26,000 hectolitres). There are numerous distilling firms in Tunis.

There are about fifteen distilling plants for fruit residues, and at least 1,500 factories producing olive-oil, besides a number of native presses manufacturing oil for local consumption only (p. 297). In the Sahel of Sfax alone there are 150 olive-oil factories with modern equipment.

The distillation of perfume is centred at Nabeul, Hammamet, and Sfax. The chief plants used include roses, oranges, jasmine, lavender, verbenas, geranium, thyme, mint, and aniseed.

Refrigeration Plants

Tunis has two ice factories and several cold-storage plants, used mainly for the storage of meat. There are other cold-storage and ice-manufacturing plants at Bizerta, Ferryville, Sousse, and Sfax.

Fishing

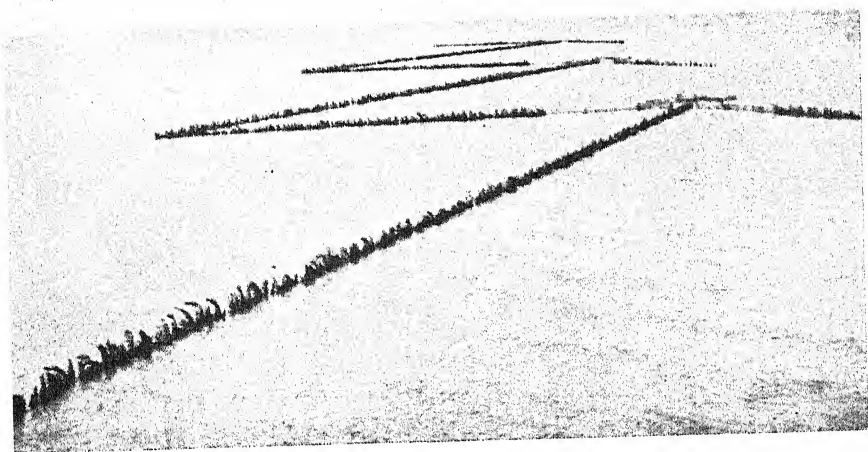
Tunisian waters abound in fish of many varieties, partly because the coastline differs widely in character, the north being steep and rocky, and the east flat and sandy with extensive beaches and enclosed stretches of salt water. More than fifty varieties are sold in the central market in Tunis, and in 1937 the total catch (including sponges) amounted to 11,558 tons, valued at 35.4 million francs. The industry employs about 12,000 persons, two-thirds being natives of Tunisia, and the rest Italians, French, Greeks, and Maltese. In 1937 the fishing-fleet numbered 3,130 vessels, including 796 engaged in sponge fishing. There is a considerable export of fresh, salted, and tinned fish, valued at 4.7 million francs in 1935 and 10.6 million francs in 1936, in which year there was a large increase in the export of tunny to Italy. Fish can be exported only under licence, and export duties are levied.

The fish caught off the Tunisian coast, some of which are not found in British waters and have no English names, include tunny, mackerel, sardines, allaches, mullet, crayfish, shrimps, and lobsters, and the common types of the western Mediterranean, such as whiting, *pagres*, *dentés*, and *daurades*. The *mérou*, the flesh of which resembles that of lobster, is also plentiful. The roe of the mullet is preserved, and it is claimed that the resulting *boutargue* is comparable with caviare.

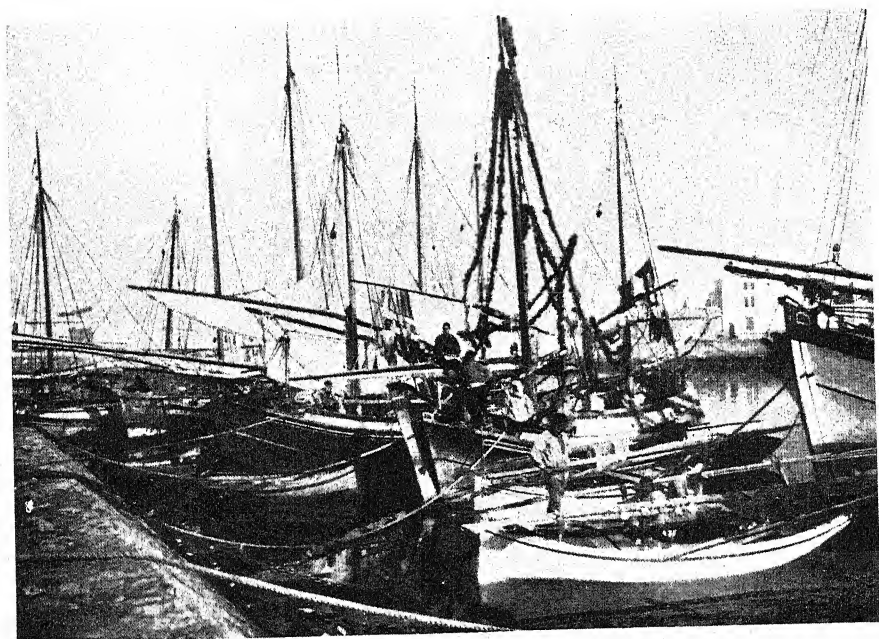
Details of the fishing industry in different areas are as follows:

Cap Roux—Cap Nègre: conger-eels, lampreys, whiting, rock mullet, *dentés*, shrimps, lobsters, and crayfish.

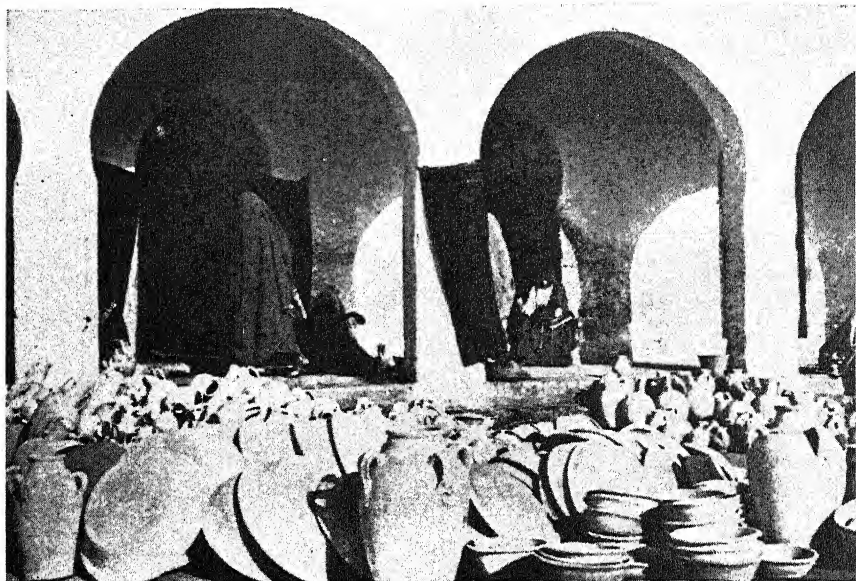
Tabarka: the main port in Tunisia for sardines and anchovies. The



189. *Fixed fishing-traps, Île Gharbi, Îles Kerkenna*



190. *Sponge-fishing boats, Sfax*



191. Pottery market, Médenine



192. Drying pots, Guellala, Île de Djerba

catch is very irregular, the fish sometimes deserting these waters for several years at a time. Formerly these fish were caught off the whole of the north coast, but they are now almost exclusively found near Tabarka. The main season for sardines is from January to May, and for anchovies from June to August. Most of the fishermen in Tabarka are Italians. In 1931 about 56 tons of fish were landed. There is some canning in the port.

Île de la Galite: mainly crayfish, shrimps, and lobsters. About 85 per cent. are caught between March and April. Mackerel are caught between November and June.

Bizerta: mainly tunny. There are numerous small tunny fisheries along the north coast: one of the largest is at Tournarha, on Ras Zebib, east of Bizerta. The Tunisian tunny differs from the Atlantic variety, being larger and having red, not white, flesh. Tunny appear about the end of November, and during the winter and early spring good catches are made off Bizerta. In May and June the tunny move in shoals along the coast making their way to the eastern Mediterranean: it is then that they are caught in the nets of the special tunny fisheries set up at different places. They reach Sidi Daoud in the Cap Bon peninsula about 22 May and the Îles Kuriate and Ras Kaboudia on 1 June, and have disappeared by 1 July. Some fish are caught in July on their return from spawning if they pass close enough inshore. The tunny fisheries are based on small harbours with buildings for housing the workers and dealing with the fish. The people are temporary inhabitants only, many of them coming from Italy and Sicily for the season and then returning to their homes. In 1938 Tunisia exported 165 tons of fresh and salted tunny mainly to Italy and Malta, and 167 tons of tunny in oil, mainly to France and Italy.

Besides the tunny fisheries, fish are also caught in the Lac de Bizerte and in the Garaet Achkel, where mullet is most common.

Porto Farina: tunny, mullet, *bars* (a kind of large mullet), *daurades*, and eels. Canning is carried on in the port.

Tunis and la Goulette: tunny, especially in the Golfe de Tunis, shrimps, and eels. Fish are also caught in the Lac de Tunis.

Sidi Daoud: mainly tunny.

El Haouaria: tunny, sole, mullet, and *loups*.

Kelibia: mackerel and allaches (a type of large sardine). Allaches are caught along the coast from Kelibia to Mahdia.

Sousse: tunny and allaches. Tunny are caught along the coast from Sousse southward. In the allache season, from April to July, fishermen come from Pantellaria and Sicily. There is some salting and canning.

Monastir: tunny and allaches. Some canning is done.

Mahdia: allaches. Much of the catch is exported to Italy and Spain.

Chebba: sole, mullet, bass, and tunny, as well as smaller fish such as *loups*, *pagres*, *pageaux*, *gobies*, *rascasses*, and *daurades*. From Ras Kaboudia to the Libyan boundary there are fixed fishing-traps off the coast, especially in the Golfe de Gabès and round the Îles Kerkenna, where the shallow water enables advantage to be taken of the tides: the nets are erected so that the fish are directed on the ebb-tide into the traps, which consist of hedges of palm leaves stuck in the mud, in the form of a V, often two or three together; the angle of the V opens into a polygonal chamber made of twigs obtained from the stalks of palm leaves (Photo. 189). This form of fishing takes place off all the small villages along the east coast.

Îles Kerkenna: tunny, octopus, and cuttlefish. Fishing is the main occupation of the islands.

Kriba: octopus.

Nakta: prawns.

Gabès: tunny and *tartarone*. There is some canning.

Bahiret el Biban: *loups*, *sars*, mullet, and red mullet. El Marsa (Marsa Ksiba) is the principal centre.

Île de Djerba: tunny, mullet, sole, and other fish. There are several fishing-centres, including Adjim, Houmt Souk, Aghir, and el Kantara (Photo. 170). Fixed fishing-traps are built along the shore but are sometimes of a different pattern from those farther north.

Sponges. Sponge-fishing is a highly specialized local industry of considerable antiquity, though it was placed on a commercial basis only in 1850. It is centred on the Golfe de Gabès, especially in the port of Sfax (Photo. 190). Italians, Greeks, and natives are engaged in the industry: the average number of boats employed is about 1,300, half of which belong to natives. Sponges are obtained by diving, by spearing, and by the use of drag nets. The best qualities are gathered by divers: these are the main types exported, after being washed. Most of the production (about 125 tons) is utilized locally. In 1938 only 7 tons of washed sponges valued at about 1 million francs were exported,

mainly to Belgium, Greece, and Italy. There is an export tax of 500 francs per ton on unwashed sponges and 1,000 francs per ton on washed sponges.

Coral. Fishing for the red coral of the Mediterranean (p. 104) takes place along the north coast off Tabarka and the Île de la Galite, but the main centre is the small Algerian port of la Calle. The industry suffered from the imposition of taxes on all except French vessels and is now very small compared with its size in the nineteenth century. Most of the coral is exported, mainly to Italy.

Canning and Preserving

Some canning, preserving, and salting of fish is carried out in the ports, usually on a fairly small scale. The fish canned are principally sardines, allaches, and tunny. Canned or salted tunny provide an annual export of about 1,000 tons to Malta and Italy.

Fruit and vegetables, especially tomatoes, are canned and preserved mainly in the Tunis district, where there are three factories.

Tobacco

About 600 tons of tobacco are usually grown each year in Tunisia (p. 294), but imports are necessary and in 1938 totalled 1,684 tons together with 548 tons of cigars and cigarettes. There is a tobacco factory in Tunis.

Paper

Little paper is manufactured in the country owing to the lack of water and fuel, although Tunisia is a leading producer of alfa or esparto grass. The bulk of the crop is exported to the United Kingdom (p. 301).

Cork

Very little cork is manufactured, most of the cork produced being exported in a raw state, mainly to Algeria and the U.S.A. (5,817 tons in 1938; pp. 308-309).

Soap

The oil used in soap manufacture is produced from the residue of the olive, known as *grignons*. Between 3,000 and 6,000 tons are produced each year in this way (p. 297). There are nineteen factories for the extraction of oil from olive cake, and the same number of refineries and soap factories which process the olive cake produced by the olive-extraction plants. Most of these factories are in the Sahels of Sousse and Sfax.

Matches

There is a state-owned match industry but the output is only small, and matches have to be imported.

Building Materials

The production of building materials is described on pp. 329-330. There are native-owned brickworks in most of the towns. Though they are generally rather primitive, the bricks produced are reputed to be equal in quality to European-made bricks. The largest works is at Manouba near Tunis, where tiles and coarse pottery are also manufactured. Bricks and tiles are normally imported, mainly from France. Unburnt bricks are widely used by native builders.

Cement production increased from 34,000 tons in 1934 to 49,000, 56,000, and 69,000 tons in 1936, 1937, and 1938 respectively. The largest of the cement factories is that owned by the Ciments artificiels Tunisiens at Djebel Djelloud near Tunis: it manufactures high quality Portland cement and employs about 150 workers. It is capable of producing 50,000 tons of cement per annum. There are other factories at Hammam Lif and Djedeida. An average of about 50,000 tons of slow-drying cement are imported each year, though the import in 1938 was only 21,000 tons. Nearly all of this has come from France since 1935, when foreign cement was subjected by a decree to a quota system.

There are numerous limestone, gypsum, and other quarries in northern and central Tunisia, most of which have been opened for the extraction of either roadstone or railway ballast.

Engineering

There are general repair shops in Tunis, repair facilities at all the larger mines, and garages where small repairs can be undertaken in many of the towns (cf. the headings of the towns and ports in Chapters X and XI). Ships of medium size can be repaired at the Sidi Abdallah dockyard in the Lac de Bizerte, where there are four dry docks and some floating docks, and at la Goulette, where there is one dry dock. Small ships are built at Bizerta. Maintenance and repair facilities are available at the main airfields. There was no armament industry in the country before the present war.

Chemicals and Fertilizers

Most of the phosphate mined in Tunisia is exported in its natural state, though a small quantity is treated with sulphuric acid and con-

verted into acid phosphate. In 1938, 44,000 tons of superphosphate were manufactured at a plant at el Afrane near Tunis. Cheddite, an explosive used in mining and quarrying, is made in a small factory at Manouba near Tunis.

Native Industries

Many local native industries are still carried on much as they were before the French occupation, especially in northern Tunisia in centres such as Tunis, Bizerta, and Béja. The French Government has encouraged the survival of these industries by the establishment of an institute of arts and crafts (the Centre d'Enseignement d'Art) in Tunis (p. 181) and of smaller schools elsewhere. Carpet making is one of the principal industries, especially in Kairouan, where a trade fair is held each Easter. In 1937 the export of printed and plain carpets was respectively 14,766 square yards and 6,026 square yards: in 1938, 5,440 square yards (valued at 449,000 francs) of printed carpets were exported and 4,730 square yards (267,000 francs) of plain carpets. Other textiles made include burnous (p. 155), kachabias, and blankets. Wool, cotton, and silk weaving is still carried out by hand looms in many districts. The dyes used are made from roots, or from the bark of the pomegranate or the Portuguese oak. In recent years the output of native textiles has declined considerably with the competition of cheap imported machine-made goods and with the change in fashions.

Local materials play a large part in these domestic industries. Some of the cotton used in Bizerta and Porto Farina, for example, comes from small plantations near Menzel Djemil and Menzel Abd er Rahman. Alfa and sometimes rushes are used in the making of mats, rope, and harness in the High Tell and in the steppes. Goat-hair is used in halters, saddle straps, and nose-bags, and camel-hair in the making of the sacks known as *gherara* used for storing cereals in the High Tell. The Nefzas people specialize in making saddle bags of wool, called *khorrj*. Wool and goat-hair are mixed by the tribes of the High Tell to make the long strips or *fidj* of which tent materials consist. The Ouled Ayar of the Maktar district and other tribes make pitch in a very primitive fashion from Aleppo pine and Phoenician juniper.

Other industries include brass- and copper-ware, leatherware, and basket-work, and the making of furniture, perfume, jewellery, and pottery. The Kroumirie tribes prepare their leather by treating it with cork-oak bark and lime. Nabeul is a centre for pottery as well as

for painted and varnished tiles and perfume. There is also a pottery industry at Médenine and on the Île de Djerba, especially at Guellala (Photos. 191, 192).

The Tourist Industry

Tunisia has much to offer the tourist from Europe and America. Besides favourable weather, especially in the winter, and a wide variety of scenery, the country is rich in Carthaginian and Roman ruins (p. 158) and has an adequate road and rail system linking the principal towns and, in normal times, good shipping and air services with foreign countries. Tunis and Kairouan in particular are attractive to tourists. Despite these advantages the industry has declined in recent years, mainly because of the economic depression in the years after 1929, though partly because a landing tax is enforced at some Tunisian ports, which are, therefore, often avoided in the planning of itineraries. The revenue derived from tourists, though considerable, is more than offset by the loss of the money taken out of the country by French officials and by many of the wealthier residents, who go to Europe during the hot season. Tourist traffic and propaganda are organized by Syndicats d'Initiative ('Essi') established in Tunis, Bizerta, Gabès, Kairouan, Korbous, Sfax, Sousse, Tabarka, and Tozeur.

POWER

Of the French North African countries, Tunisia is the least well endowed in sources of power, especially compared with French Morocco. The main sources are coal, petroleum, and electricity; gas is important only in Tunis, and timber is used as fuel on only a small and local scale.

Coal

There is no domestic production of coal, although over 174,000 tons of lignite were extracted during and after the War of 1914-1918 (p. 327). Tunisia's requirements of solid fuels have, therefore, to be met by heavy imports. In 1938 these amounted to 210,377 tons of coal, 7,826 tons of coke, and 19,830 tons of briquettes, over three-quarters of which came from the United Kingdom and rather less than 10 per cent. from Germany. Coal is consumed by the railways, which used 19,000 tons of briquettes and 3,000 tons of coal in 1938, by the electric power station at la Goulette, which generates five-sixths of the country's total electricity, and by factories and private individuals. In addition

the ports of Bizerta, Tunis, la Goulette, Sousse, and Sfax normally supply a certain amount of coal to vessels, although none can be termed a first-class coaling station (p. 233).

Petroleum

There has been some prospecting for oil in Tunisia and there are a few borings in the north, but so far no substantial results have been obtained (p. 327). The country must, therefore, rely wholly on imported oils. In 1938, 13,771,208 gallons (625,964 hectolitres) of motor spirit, 6,588,010 gallons (299,455 hectolitres) of kerosene, 5,078 tons of lubricating oils, and 37,848 tons of gas, diesel, and fuel oils were imported from Roumania, the U.S.A., and elsewhere (p. 355).

The largest oil installations are on the coast. The details given in Appendix I refer to conditions before the campaign in French North Africa; subsequent information is not available for publication. The principal coastal installations were in the ports of Bizerta and la Goulette; there were others at Tunis, Sousse, Sfax, Gabès, Mahdia, and Tabarka. Of the installations in the interior, information is limited to those belonging to the Shell Company, but the tankage of other companies was very small. The installations were at Bou Arada, Mateur, Ebba Ksour, Medjez el Bab, Pont du Fahs, Souk el Khemis, Béja, el Akhouat (south of Teboursouk), le Sers, and Kairouan: the largest of the tanks had a storage capacity of 16,245 cubic feet (460 cubic metres) and the smallest 2,120 cubic feet (60 cubic metres). Before the war all these depots stocked benzine and kerosene and, in some cases, gas oil.

Electricity

Tunisia has the least well-developed electrical system in French North Africa. Owing to the absence of rivers of any size or regularity of flow, even in the better watered northern Tell, and the marked seasonal character of the rainfall, the country is almost completely deficient in hydro-electric resources, and there appears to be no possibility of development. The country relies, therefore, entirely on thermal power stations for its supply of electricity, these, in turn, being dependent upon imported supplies of coal and fuel oil; thus all the main stations are in the ports.

The total power installed in 1937 was 42,790 kW., and the total number of units generated increased from 26 millions in 1927 to 59.5 millions in 1937 and 67 millions (estimated) in 1938: this represents only about half the power generated in French Morocco, and a quarter

of that of Algeria. It was reported in 1940-1941 that the production of electricity had been reduced by about 75 per cent. on account of the shortage of coal, though some attempt was made to open up the lignite workings in the Cap Bon peninsula.

The power is used mainly for lighting and public utilities, for driving the tramways in Tunis, and for the supply of the arsenal at Sidi Abdallah near Ferryville. Electricity is also used to a considerable extent in industry and at some of the mines.

The electrical system consists of a comparatively well-developed area around Tunis and a few small isolated installations in other parts of the country. The largest power station is that at la Goulette, with a capacity of nearly 35,000 kW.: though not large by modern standards, it is at least ten times as large as any other in the country. All power stations, with the exception of la Goulette, which is steam driven, have diesel engines. There is little transmission of electricity except for the 30- and 60-kV. trunk lines radiating for about 45 miles north-west and south-east of Tunis, and consequently there are few sub-stations of importance: the largest is Tunis Marine. There are also a small 30-kV. system in the mining area around Souk el Arba, and a 10-kV. line between Ferryville and Mateur. Considerable developments have been planned, mainly for the extension of high-voltage lines westward along the Medjerda valley to connect with this mining area, and southward to Sousse. Little, if any, of this work has been started. In 1937 there were in all 804 miles (1,294 km.) of high-tension lines and 578 miles (930 km.) of low-tension lines (Fig. 67).

Three-phase current at 50 cycles is the standard of the local electricity supplies, and it is fairly evenly divided between 110/200 volts and 220/380 volts. The 'declared' voltage for different localities is, however, liable to vary from the above figures by about 10 to 20 volts. The lower voltage is usual for a radius of about 8 miles around Tunis, and at Bizerta, Béja, Souk el Khemis, le Kef, Mateur, TebourSouk, Sousse, Sfax, Gafsa, and in the Souk el Arba mining area. Ferryville and Gabès have D.C. supplies on the lower voltage. Elsewhere the higher voltage is generally used (cf. the headings of the towns and ports in Chapters X and XI).

The location of the generating stations and sub-stations and the distribution network are shown in Fig. 67. Certain modifications have occurred since the north African campaign, but details are not available for publication. The chief companies concerned in the production of electricity are the Compagnie des Tramways de Tunis and the Société de Distribution d'Électricité de Sousse, which supplies most of the

towns of the Sahel of Sousse. There are several other companies in Tunis, and Bizerta is supplied by the Société d'Énergie électrique de la Ville de Bizerte. The generating stations with their capacities in 1937 are shown in the following table, and the state of the four largest stations in that year is briefly described.

Station	Capacity (kW.)
La Goulette	34,800
Sfax	3,070
Bizerta	1,770
Sousse	1,760
Souk el Arba	368
Ferryville	366
Béja	280
Gabès	216
Gafsa	160

La Goulette. This station, which generated 49.6 million units in 1937, over 80 per cent. of the country's total power output, and had a capacity of 34,800 kW., was a steam plant using coal. It stood south-west of the town on the northern side of the Canal de Tunis (Fig. 46). Power was distributed by three out-going lines at 30 kV., five at 11 kV., and two at 5.5 kV., and there were two sub-stations within the station, one of which raised the voltage to 60 kV. for the line to Bizerta. The arsenal at Sidi Abdallah was one of the chief consumers of the power generated. The station also supplied the tramways of Tunis by means of sub-stations in Tunis, and all other power and lighting for a radius of about 36 miles around Tunis.

Sfax. This, the second largest power station in the country, lay about a quarter of a mile south-west of the Kasba outside the walled town (Fig. 53). It was a diesel station with a capacity in 1937 of 3,070 kW., and an output of 3.1 million units. There were two subsidiary stations at either end of the Quai des Phosphates: they were probably used for harbour appliances only.

Bizerta. The station was on the neck of the Pointe de l'Infirmierie south of la Pêcherie railway station (Fig. 44), and was a diesel station with a capacity of 1,770 kW.: in 1937 its output was 2.1 million units. The power generated supplied the town and surrounding district and the adjacent naval installations. Another station (also diesel), about 300 yards west of the railway goods station, was used as a standby.

Sousse. The station stood in the Avenue Henri Boucher on the southern side of the walled town (Fig. 49). It was a diesel station with a capacity of 1,760 kW., and an output in 1937 of 3 million units.

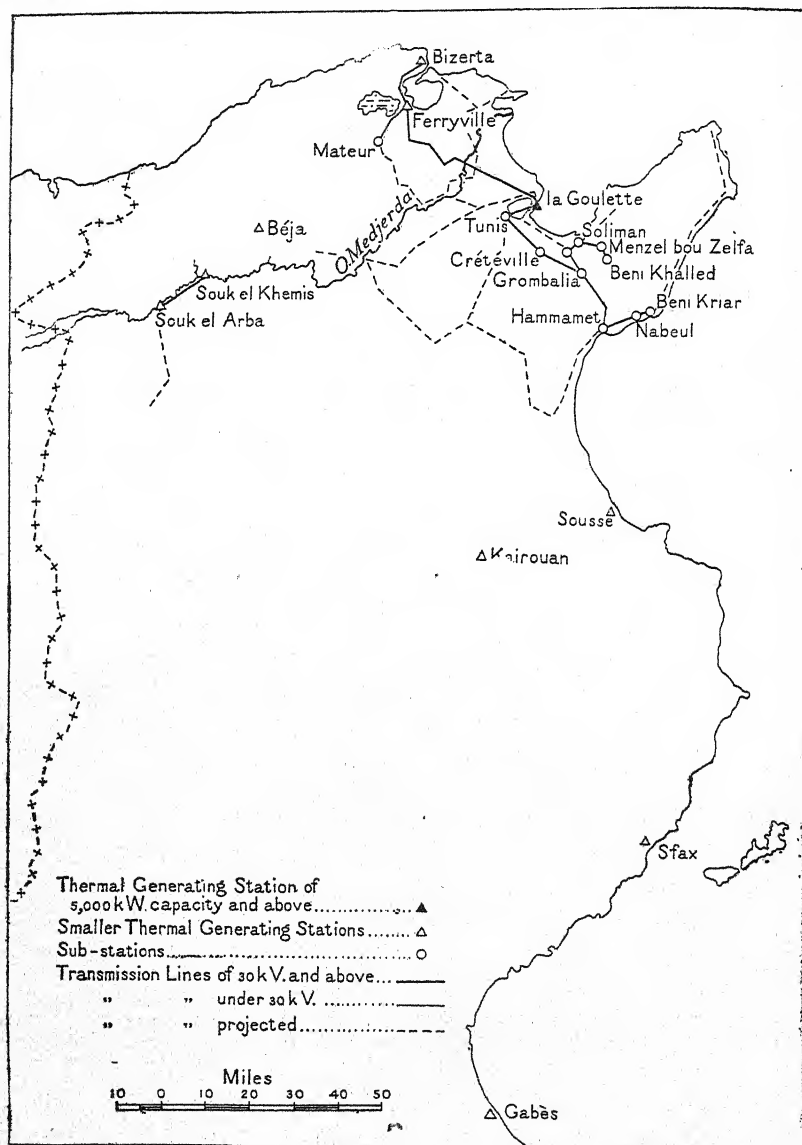


FIG. 67. *Electricity generating stations and distribution networks*

About 400 yards to the south-west there was a sub-station. Electricity was supplied to the town and also to the surrounding district as far as Kairouan and Monastir.

Gas

The following information gives the situation before the campaign of 1942-1943. The production of gas was limited to Tunis and Sfax. The gasworks in Tunis were in the suburb of Franceville (Fig. 48) and produced 233.6 million cubic feet (6,617,730 cubic metres) in 1937. Consumption rose from 116.1 million cubic feet (3,316,569 cubic metres) in 1930 to 216.9 million cubic feet (6,145,847 cubic metres) in 1937, of which 543,479 cubic feet (15,396 cubic metres) were used for public lighting. The company responsible for gas production was the Compagnie du Gaz et des Eaux de Tunis. The gasworks in Sfax were in the harbour opposite the Quai du Commerce (Fig. 53): coal gas was also produced at the main electric power station. No statistics of production are available.

Timber

No precise figures of the quantity of timber used as firewood are available. In 1938, 470 tons of firewood and 399 tons of charcoal were imported.

CHAPTER XIV

COMMERCE AND FINANCE

COMMERCE

TUNISIA traded with the countries of the Mediterranean basin and with the interior during Carthaginian and Roman times, but from the close of the Roman occupation of north Africa normal trade was interrupted by hostile nomadic tribes and by the struggles between the Arabs and Berbers. Later, trade between Europe, particularly Italy, and the Sudan led to great commercial activity and prosperity for the Barbary Arabs. Tunisian cities such as Tunis, Kairouan, Sfax, and Gabès, which lay at the termini of caravan or sea routes, became important markets and manufacturing centres. Ivory, ebony, ostrich feathers, gold dust, and slaves from the Sudan and the gulf of Guinea were exchanged for salt, copper, glass beads from Venice; wine from France, Greece, and Spain; European cloths; and local products including silk from Gabès, sugar from Kairouan, and cotton and woollen cloths, olive-oil, coral, and pottery from Tunis and Sfax. During the same period piracy was an additional and recognized method of trading.

The competition of sea-borne traffic around the African coast and the decline of the slave trade were the chief causes of the decay in the trans-Saharan caravan routes, the lack of slaves to cultivate the oases along the routes being a greater cause than the loss of the actual slave trade. The principal exports from west Africa were then conveyed to the northern markets by the circuitous, but safer and cheaper, sea-route, and the same applied to European manufactures and salt. Tunisian markets were no longer busy entrepôts and fell into decay.

The advent of the French in north Africa revived commercial activity, in Tunisia especially after the establishment of the Protectorate in 1881, when France became the principal trader. In 1890 a customs regulation arranged for certain products to be admitted to France duty-free, and others at a reduced tariff. After the War of 1914-1918 a progressive development of the system of 'imperial preference' was introduced which resulted in about three-fifths of Tunisia's import and export trade being with France and Algeria. In 1928 there was an almost complete customs union with France

and Algeria whereby all Tunisian merchandise, except salt and wine, was exempt from tariff on condition that similar products from France entered Tunisia duty-free, and that foreign goods were taxed as in France. The French share in the import trade suffered after 1930 with the dislocation of foreign exchanges, but improved slightly after France went off the gold standard.

After France, with which Algeria is often included for statistical purposes, the United Kingdom has the largest share in the total trade of Tunisia, occupying second place in the export trade and fifth in the import trade. Both the United Kingdom and France are responsible for about one-third of Tunisia's total trade by weight, but whereas 58.6 per cent. of the total value of the trade of Tunisia is with France, only 8.2 per cent. is with the United Kingdom. Most of Britain's imports are comparatively heavy raw materials. It takes all Tunisia's export of alfa (esparto grass), nearly 80 per cent. of the iron ore, 39 per cent. of the goat- and camel-hair, 15 per cent. of the phosphate, 8 per cent. of the wool, and 4 per cent. of the vegetable oils. British exports to Tunisia also consist mainly of heavy goods: over half are coal, coke, and patent fuels, and the remainder coal-tar, metal goods, and machinery. The rest of the British Empire supplies Tunisia with tea and small quantities of certain foodstuffs, liquid fuels, and tobacco.

In spite of the large Italian population in the country, Italy is responsible for only 2 per cent. by weight and 6 per cent. by value of the total trade of Tunisia. The principal Italian purchases are natural phosphate and olive-oil, and Italy provides Tunisia with various manufactured goods, a certain amount of fresh fruit and vegetables, and marble. Of other countries trading with Tunisia, the U.S.A. supplies machinery, lubricating oils, and tobacco, taking cork, olive-oil, and goat- and camel-hair in return; the Netherlands supply dairy products and meat, with tea and oil from their colonies, and purchase phosphate and salt; Roumania sends oil and petroleum.

The Balance of Trade

Tunisian commerce depends greatly upon metropolitan France, but not to the extent of that of Algeria. Approximately 70 per cent. of Tunisia's exports by value are agricultural products, two-thirds of which are sent to France and Algeria, and 4 per cent. are livestock and animal products, of which almost all go to France. In return France sends manufactured goods, and the French Colonial Empire

various tropical commodities. About 22 per cent. of the exports are minerals, of which France takes less than half, the remainder going principally to the United Kingdom, and also to Italy, the Netherlands, and Belgium. Of Tunisia's imports, over 50 per cent. are manufactures, of which 14 per cent. are textiles, 15 per cent. food-stuffs, and 10 per cent. fuel. Invisible items of trade include banking and insurance, shipping services, interest on invested capital supplied from abroad, and tourist traffic, all of which are liabilities, the interests being mostly in foreign hands. The tourist traffic has decreased in recent years (p. 340), and such benefits as still remain are more than offset by the money taken out of the country by French officials and the wealthier residents who go to Europe during the hot season. During the period 1928-1938 Tunisia had an adverse trade balance owing to the fall in price of primary articles without a corresponding reduction in the cost of manufactured goods. In 1931 the deficit reached 1,037 million francs: it fell to 173 million francs in 1936, but has since risen again. In 1938 the exports of Tunisia were valued at 1,353 million francs, and the imports at nearly 1,560 million francs, giving an adverse balance of about 207 million francs. These figures are analysed in the following table, which shows the major part played by France and Algeria in Tunisian trade. Details of the foreign trade by countries are given in Appendix J (Table 1). The fluctuations in the country's trade between 1929 and 1938 are illustrated in Fig. 68.

Imports and Exports, 1938

(Figures in thousands of francs)

	<i>Imports</i>			<i>Exports</i>		
	<i>From France and Algeria</i>	<i>From other countries</i>	<i>Total</i>	<i>To France and Algeria</i>	<i>To other countries</i>	<i>Total</i>
Animal products .	29,606	34,366	63,972	32,447	31,573	64,020
Vegetable products .	227,110	218,958	446,068	650,649	275,723	926,372
Mineral products .	73,687	153,246	226,933	103,984	210,254	314,238
Manufactured goods	699,857	122,727	822,584	32,952	15,507	48,459
TOTAL . . .	1,030,260	529,297	1,559,557	820,932	523,057	1,353,089

Exports

The value of Tunisian exports fluctuates widely from year to year: thus in 1929 it was 1,408 million francs, but dropped steadily to 674 million francs in 1934, though by 1938 it had risen again to 1,353 million francs. Wheat, wine, and olive-oil are the leading

agricultural exports, and phosphate rock and iron ore the chief mineral exports. Details of the export trade are given in Appendix J (Table 2), and the main items are described below. The general importance of Tunisia to France, both as market and as source of supply, is not great, for in 1938 Tunisia supplied only 1.9 per cent. of the

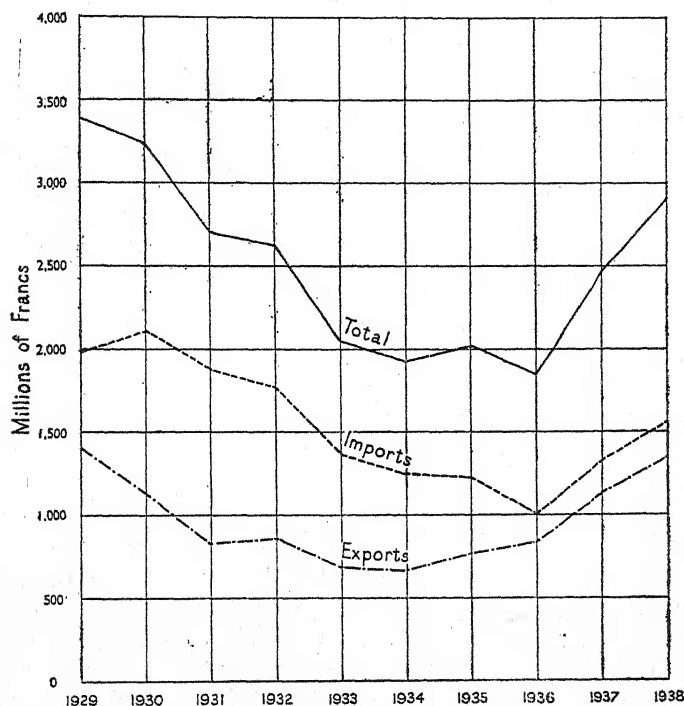


FIG. 68. *The foreign trade of Tunisia, 1929-1938*

total value of French imports, and took only 3.2 per cent. of her total exports. The United Kingdom takes the same percentage of the exports by weight as France, but only 13.7 per cent. of the total by value. Italy takes third place with 9.2 per cent., and the U.S.A. and the Netherlands fourth and fifth places with a little over 2 per cent. each.

Wheat and Wheat Flour. The wheat market is organized and controlled as in France and Algeria, and prices, which in normal times are maintained at the same level as in France, are fixed by the Office Interprofessionnel du Blé. Exports of both hard and soft wheat have risen considerably in recent years, as shown in the table

below, and in 1938 totalled 82,200 tons, over four-fifths of which went to France, Algeria, and French Morocco.

Exports of Hard and Soft Wheat, 1936-1938

	1936		1937		1938	
	<i>Weight (tons)</i>	<i>Value (francs)</i>	<i>Weight (tons)</i>	<i>Value (francs)</i>	<i>Weight (tons)</i>	<i>Value (francs)</i>
Hard wheat	8,955	12,537,000	36,113	64,545,000	27,036	52,005,000
Soft wheat	20,572	28,801,000	32,248	60,918,000	55,164	112,727,000
TOTAL	29,527	41,338,000	68,361	125,463,000	82,200	164,732,000

The early harvest in Tunisia favours the export trade, especially in soft wheat, as there is a ready market in France between seasons. Production is, however, insufficient for local needs and has to be supplemented by imports at other seasons (p. 290). A considerable quantity of wheat flour is exported, amounting in 1938 to 14,704 tons valued at 41.1 million francs.

Barley and Oats. Exports of both barley and oats fluctuate considerably from year to year. Thus in 1938 only 12,942 tons of barley, valued at 17.3 million francs, were exported, compared with 34,037 tons in 1937 and 10,141 tons in 1936: 7,937 tons of oats, valued at 10.6 million francs, were exported in 1938 compared with only 2,821 tons in 1936 and more than 11,760 tons in 1937. Over 90 per cent. of both cereals is sent to France and Algeria, but a small quantity of barley is taken by the United Kingdom for the brewing of beer, and some oats go to Italy and Libya.

Cereal Preparations. A small quantity of both semolina and pastes (macaroni, &c.) is sent to France each year, amounting in 1938 to 9,152 tons of semolina and 273 tons of pastes.

Olive-oil. Olive-oil is, in most years, the most valuable single export. It is admitted duty-free into France, but there is an export tax in Tunisia, varying according to the district from which the oil comes. A temporary surtax was added in December 1936 after the failure of the crop of that year. Exports fluctuate greatly from year to year. In 1936, 26,365 tons, valued at 84.4 million francs, were exported, in 1937, 16,536 tons (123.3 million francs), and in 1938, 35,193 tons (308.1 million francs). France and Italy are the principal customers, but smaller amounts go to the U.S.A., Norway, and the United Kingdom. Much of the oil taken by Italy is further refined and then exported to France, the U.S.A., and Latin America. Some

oil is produced from the residue (*grignons*), and is used mainly for soap-making. In 1938, 5,287 tons of a value of 24,679,000 francs were exported, nearly three-quarters of which went to the U.S.A.: most of the remainder went to France, the United Kingdom, and Germany.

Wines, Musts, and Liqueurs. Wine forms 13 per cent. of the total exports of Tunisia and is one of the main sources of local wealth. Tunisian wines are especially suitable for blending as they are rich in alcohol (usually 13 to 14 degrees). Red wines are the chief variety exported. Since 1931 it has been illegal to export any wine under a strength of 11 degrees. France is almost the sole importer of Tunisian wines, high tariffs making it difficult to export to other countries, although small quantities go to Belgium, Switzerland, and Germany. In 1935 the quota of Tunisian wines entering France duty-free was increased from 12.1 million gallons (550,000 hectolitres) to 16.5 million gallons (750,000 hectolitres), and that of musts (new wine) and liqueurs to 1.6 million gallons (75,000 hectolitres): a further quota of 11 million gallons (500,000 hectolitres) could be imported at a preferential rate of 30 francs per hectolitre. In 1938, 23,116,000 gallons (1,050,725 hectolitres) of wine were exported, their value amounting to 152.3 million francs. The trade in recent years is summarized in the following table:

Exports of Wine, 1936-1938

	1936		1937		1938	
	Quantity (hectolitres)	Value (francs)	Quantity (hectolitres)	Value (francs)	Quantity (hectolitres)	Value (francs)
Wines	1,258,855	144,825,000	893,266	128,563,000	1,050,725	152,305,000
Musts	48,867	12,173,000	47,716	13,509,000	50,562	16,593,000
Liqueurs	15,950	6,395,000	21,942	6,477,000	16,192	6,709,000
Brandy	6,360	3,816,000	6,114	3,404,000	1,386	1,180,000
TOTAL	1,330,032	167,209,000	969,038	151,953,000	1,118,865	176,787,000

Fruits. Although most varieties of European fruits are grown in Tunisia, dates, citrus fruits, and almonds are the only types exported in any quantity, and the income derived from these is almost counter-balanced by the imports of foreign fruit. In 1938, 3,478 tons of dates, valued at over 7 million francs, were exported: 993 tons were best quality (deglet-nour) dates, most of which went to France and Algeria, and 2,485 tons were of the common varieties which were sent only to Algeria. Efforts have been made to increase the production and export of citrus fruits in recent years, and Tunisia benefited

from the effect of the Spanish Civil War upon the citrus trade of Spain. In 1938, 4,080 tons (including 2,650 tons of oranges), valued at 6.8 million francs, were exported, almost solely to France. In the same year there was an export of 477 tons of almonds, valued at 5.8 million francs, mainly to Egypt and France.

Vegetables. Production of vegetables is often barely adequate for local needs, and some crops have to be supplemented by imports. Only dried peas, beans, and lentils are exported in normal years (590 tons in 1938).

Alfa (Esparto Grass). The alfa crop varies considerably from year to year for reasons explained on p. 301, and exports fluctuate accordingly. Thus 83,764 tons were exported in 1936 and 129,409 tons, valued at 50 million francs, in 1938. An export tax of 25 francs per ton is payable on all alfa sent to countries other than France: the bulk of the crop is sent to the United Kingdom where it is used for paper-making.

Cork. Of the cork produced in 1938 (5,817 tons valued at 5.3 million francs), about three-quarters went to Algeria, and almost one-fifth to the U.S.A.

Livestock. As explained on p. 303, there are difficulties in the way of the development of an export trade in livestock, and the trade is both small and variable. The total trade in 1938, valued at 10.4 million francs, was smaller than usual. Only 894 head of cattle were exported, compared with 14,576 in 1937, mainly to Algeria and France; exports of sheep and goats, for the most part to Libya, were 65,159 and 31,650 respectively, compared with 121,013 and 46,792 in 1937; the export of pigs, chiefly to Algeria, declined from 8,893 in 1937 to 4,723 in 1938.

Meat. There is no foreign trade in killed meat except for a little mutton: 853 tons were exported in 1937, and 80 tons, valued at 677,000 francs, in 1938. Nearly all of it goes to France.

Hides and Skins. Although a considerable proportion is used locally by native industries there is a small surplus of hides and skins for export. In 1938, 2,709 tons, valued at 24.5 million francs, were exported, mostly to France with smaller quantities to Czechoslovakia, Denmark, Libya, Italy, and the U.S.A. The value varies between 10 and 24 million francs per year.

Wool, Goat-hair, and Camel-hair. Production of wool and, therefore, its export vary considerably from year to year (1937, 3,642 tons; 1938, 904 tons): a substantial part of the production is used in native industries. The exports consist partly of wool in grease and partly of

washed wool. France is the leading customer, followed by Libya, and smaller quantities go to the United Kingdom, Germany, the Netherlands, and Belgium. Some of the goat- and camel-hair is used locally, but 490 tons, valued at over 4 million francs, were exported in 1938: over half went to the United Kingdom and about one-third to the U.S.A.

Phosphate. Tunisia is third in the world production of phosphate after the U.S.A. and the U.S.S.R., and the largest exporter of phosphate rock. The exports account for more than 10 per cent. of the total value of the country's export trade. Exports have fluctuated considerably during the present century (Fig. 63). In 1937 exports reached 1,927,792 tons, valued at 153.3 million francs, and in 1938, 1,591,276 tons (132.6 million francs). There is a fairly large market for Tunisian phosphate; normally France takes about 27 per cent., Italy and the United Kingdom about 25 per cent. each, and the Netherlands, Spain, and Belgium most of the remainder (Fig. 64). A working agreement concluded with other producing countries has had a beneficial effect on prices. Tunisian and Algerian phosphate is marketed by the Comptoir des Phosphates d'Algérie et de Tunisie (p. 316).

Iron Ore. The greater part of the output of iron ore is exported, there being no iron and steel industry in the country. Exports have risen in recent years from 486,920 tons in 1935 to 974,458 tons, valued at 73.8 million francs, in 1937 and 802,542 tons (107.1 million francs) in 1938. The United Kingdom takes nearly 80 per cent. of the total exports in normal times (730,167 and 463,726 tons in 1937 and 1938 respectively): most of the remainder goes to Germany.

Lead and Zinc. In 1938, 6,267 tons of lead ore were exported and 20,513 tons of pig lead, of a total value of 64.1 million francs. Nearly 90 per cent. of the lead ore went to Belgium, the United Kingdom taking most of the remainder: France, however, took about 70 per cent. of the pig lead, the rest going to the United Kingdom and Algeria. Belgium was by far the greatest purchaser of zinc ore, of which 1,045 tons, valued at 212,000 francs, were exported in 1938.

Salt. Exports of salt, the exploitation of which is a government monopoly (p. 328), vary between 60,000 tons and 145,000 tons per annum. Norway, the U.S.A., France, Japan, and Sweden are the chief customers. The 93,552 tons of salt exported in 1938 were valued at 3.6 million francs.

Imports

The principal imports of Tunisia are fuels, chemicals, manufactured goods, including textiles, iron and steel goods, fertilizers, and cement, various tropical products, and other commodities and food-stuffs not produced in the country, or produced in insufficient quantities. Details of the import trade are given in Appendix J (Table 3), and the principal items are described below. The value of the import trade declined rapidly after 1930, reaching its lowest level in 1936 with 1,013.6 million francs: since then its value has increased, and in 1938 was 1,569 million francs. France supplies nearly 60 per cent. of Tunisia's imports by value and Algeria 5 per cent., followed by the U.S.A., the United Kingdom, Roumania (mainly oil), Italy, and the Netherlands.

Textiles. The main imports are cotton and wool yarns, cotton, woollen, and rayon cloths, jute sacks, rope, and twine. France normally supplies the greater part of the yarns, which were imported to the value of over 17 million francs in 1938: smaller amounts come from the United Kingdom, Italy, Belgium, and the Netherlands. The 4,922 tons of cotton cloth, 112 tons of woollen cloth, and 260 tons of rayon tissue imported in 1938 had a total value of 140.5 million francs. In addition clothing worth 14.6 million francs, jute sacks worth 12.3 million francs, and rope and twine worth 4.6 million francs were imported in the same year. France again was the largest source of these imports, though other supplying countries included Italy, the United Kingdom, Czechoslovakia, Japan, and various French colonies.

Metal Goods and Minerals. In 1938, 27,106 tons of iron and steel goods were imported, almost entirely from France, with a small quantity from the United Kingdom, Belgium, and Germany. France also supplied the greater part of the 715 tons of copper and copper manufactures, the 16,022 tons of lead and lead manufactures, and the 421 tons of non-ferrous metals. The 7,969 tons of machinery imported came mainly from France and the U.S.A., but also from the United Kingdom, Czechoslovakia, and Germany: 2,047 motor-cars, valued at nearly 61 million francs, were imported from France and the U.S.A.

Fuel. In normal times the United Kingdom supplies more than three-quarters of Tunisia's imports of coal, the remainder coming from Germany, Poland, the Netherlands, Belgium, and France. Belgium supplies most of the coke, followed by the United Kingdom and Germany. In 1938, 210,377 tons of coal, 19,830 tons of briquettes,

and 7,826 tons of coke were imported, the total value being 58 million francs. Nearly three-quarters of the motor spirit and kerosene is supplied by Roumania, though a considerable quantity also comes from Persia, with a little from the U.S.A. and Iraq. Lubricating oils and gas, diesel, and fuel oils are supplied mainly by the U.S.A., Roumania, and to a less extent by the Netherlands East and West Indies, Mexico, Persia, and Iraq. In 1938, 13,771,208 gallons (625,964 hectolitres) of motor spirit, 6,588,010 gallons (299,455 hectolitres) of kerosene, 5,037 tons of lubricating oils, and 37,848 tons of gas, diesel, and fuel oils were imported; their total value was 85 million francs.

Chemicals. Chemical fertilizers, copper sulphate, medicines, dyes, and other chemicals are imported mainly from France and Algeria, but also, in lesser amounts, from Italy, Belgium, the Netherlands, and the United Kingdom. In 1938, 8,774 tons of chemical fertilizers and 15,764 tons of other chemicals were imported of a total value of 31.2 million francs.

Cement. Although Tunisia produces an increasing amount of cement (p. 338), supplies have to be supplemented by imports, nine-tenths of which come from France and the remainder mostly from Yugoslavia. In 1938, 20,991 tons of slow-drying and 122 tons of quick-drying cement, valued at over 5 million francs, were imported; 2,358 tons of cement manufactures, valued at 3 million francs, were also imported.

Timber. Timber is imported from France, Algeria, and various French colonies, Yugoslavia, Sweden, and Poland. Most of it is squared and sawn timber, firewood, railway sleepers, or pit-props. In 1938, 56,067 tons of timber and 68 tons of cabinet woods, with a total value of 38.2 million francs, were imported.

Tobacco. Insufficient quantities of tobacco are grown in the country (p. 294), and supplies have to be supplemented by imports amounting to between 1,000 and 2,000 tons a year. In 1938, 1,720 tons of leaf tobacco and cigarettes and 519,800 cigars, with a total value of 12.6 million francs, were imported, mainly from the U.S.A., Hungary, the Netherlands East Indies, and the British Empire, with small quantities from Greece, Bulgaria, and Turkey.

Foodstuffs. Foodstuffs imported include sugar, cereals, tea, coffee, dairy products, fruits, potatoes, meat, and vegetable oils. In 1938 the imports of these commodities had a total value of 326 million francs: 35,259 tons of sugar were imported, mainly from France; 80,208 tons

of cereals from France, Algeria, and various French, British, and Dutch colonies, including wheat (393 tons, mainly hard wheat), barley (5,686 tons), maize (9,837 tons), rice and rice flour (53,435 tons), food pastes (3,197 tons), and flour (766 tons); 2,093 tons of tea from the British Empire, China, and the Netherlands East Indies; 1,553 tons of coffee, almost entirely from Brazil; 1,736 tons of butter and 1,226 tons of cheese from France, Denmark, the Netherlands, and Argentina; 15,638 tons of potatoes and 6,156 tons of fruits from France, Italy, the U.S.A., Algeria, Egypt, Spain, and Iraq; 725 tons of meat from France, Denmark, Argentina, Poland, and the Netherlands; and 1,832 tons of vegetable oils from France, Algeria, the Netherlands and the Netherlands East Indies, Denmark, and Belgium.

Shipping

About half the shipping entering Tunisian ports is French, about 30 per cent. Italian, and 10 per cent. British. Of the other nationalities only Spanish, Yugoslav, American, Dutch, and Greek shipping is of any importance. Most foreign-going steamers call at the five principal ports of Sfax, Tunis, la Goulette, Sousse, and Bizerta. The smaller ports are used mainly for coastal trade, and for communication between the mainland and the islands off the Tunisian coast such as the Île de Djerba, the Îles Kerkenna, the Îles Kuriate, and the Île Zembra: there is also some trade with Sicily. The Tunisian mercantile marine consists of a large number of small vessels of an average carrying capacity of less than 40 tons, many being sailing vessels: there are also some Italian sailing vessels.

The various shipping companies and the services operated are listed on pp. 412-413: the principal concerns are the Compagnie générale Transatlantique and the Compagnie de Navigation mixte.

In 1937, 7,011 ships with a total tonnage of 4,735,325 entered Tunisian ports: they carried 84,406 passengers and 950,925 tons of merchandise. In the same year 7,006 vessels of 4,737,446 tons sailed from Tunisia with 86,572 passengers and 3,714,446 tons of cargo. The bulk of the trade passed through the five main ports (Fig. 41). Details of the shipping of the individual ports are given in Chapter XI.

About half of Tunisia's shipping passes through the Straits of Gibraltar, mainly to and from the Atlantic ports of France and, to a lesser extent, the United Kingdom and north-west Europe generally: 40 per cent. is concerned with the western Mediterranean, mainly

France and Italy, and only 10 per cent. with the countries of the eastern Mediterranean. Of the shipping with France, about half is with Marseilles, and most of the remainder with Dunkirk, Rouen, Bordeaux, Sète, and St. Louis du Rhône.

FINANCE

BEFORE the French occupation of the country the finances of Tunisia were governed by an international commission established in 1869, and in which France, Great Britain, and Italy had equal interest. The commission was chiefly concerned with preventing an increase of the Public Debt. It divided the revenue of the State into two parts: the first was allotted to the Bey to pay for the general administration of the country; the second, a fixed sum, went to pay off the Public Debt, which then amounted to 125 million francs. A special body, the *revenus concédés*, dealt with the collection of taxes for this fund.

After the establishment of the Protectorate, Great Britain and Italy agreed by the Treaty of la Marsa (June 1883) to the abolition of the commission on condition that France guaranteed the Public Debt. In 1884 the commission was accordingly abolished by decree, and its functions transferred to the Department of Finance. The head (*directeur*), appointed by the Bey, had the function of Minister of Finance, and the Treasurer-General was in charge of the Treasury, controlling all receipts and expenditure, and having a corps of tax inspectors working under him.

The Budget

Before the French protectorate there was no budget, merely a list of expenses. The list of receipts was very variable because it depended upon the energy of the Government in the collection of taxes and the compliance of the taxpayers. It was also difficult for the State to prepare a budget in advance as there was no foreknowledge of the amount of resistance by the taxpayers. The first budget, introduced in 1883, was in piastres and was for the Moslem year which began on 13 October. In 1891 this system was abandoned, the budget being prolonged by a special decree to cover the period until 31 December. Since 1892 the financial year has started on 1 January, and the budget has been in francs.

At first the budget was discussed by the Council of Ministers and chiefs of the services, but after 1907 it was examined by a Commission,

which was replaced by the Grand Council (pp. 166-167) in 1922. All sections of the budget, except for the Public Debt and the civil list, the department of the Secretary-General, the administration of French justice, and general security measures, were open to examination. No loan could be made without the approval of the two sections of the Grand Council, and any amendments were discussed in plenary session. Having been approved by the council, the budget went to the Minister of Foreign Affairs in Paris, was sealed by the Bey, and published in the *Journal officiel tunisien*.

Tunisia has always attempted to be as independent as possible of financial aid from France, but certain expenses appear in the budget of metropolitan France, and a branch of the French Treasury operates in Tunisia. The expenses of the gendarmerie are entered in the French budget, but a corresponding sum is made out in the Tunisian budget: until 1905 there was the same procedure for the expenses of French justice, which are now entirely borne by Tunisia. In 1903 Tunisia took over the guarantees of interest in the Bône-Guelma (Railway) Company for their Tunisian network, but France has continued to pay a subsidy decreasing gradually in amount and due to terminate in 1957. As in Algeria, France has subsidized the shipping companies carrying mails, and paid the pensions of civil servants who had served for some part of their career in Tunisia. The greatest expense borne by France is that of the army, for which she pays in full. Until 1906 she paid for the administration of the Territoires militaires du Sud, the expenses of which now form part of the Tunisian budget.

In the first few years after the introduction of the budget, until 1894, receipts exceeded expenditure owing to good harvests and the new methods of collecting taxes: the surplus went towards public works, particularly railway construction and colonization. As, however, the greater part of the revenue comes from indirect taxation or from taxes paid by farmers, actual receipts often fall below the estimated in a bad year, thus giving rise to a deficit. The balancing of the budget has, therefore, always been uncertain, though until 1932 expenditure did not generally exceed receipts. After 1933 receipts diminished owing to the economic depression, and as there was little possibility of increasing existing taxation or of imposing new taxes, assistance had to be sought from the French Government. After the very bad harvest of 1936 extensive relief had to be given, and the greatly increased expenditure was met in a variety of ways. Tunisia was given a share of a half, instead of one-third as in 1928,

of the profits derived from the revaluation of the gold cover held by the Banque de l'Algérie, and 50 million francs were granted by the French public works development fund. Apart from these exceptional grants, additional revenue was raised by a unified customs tax known as the 'taxe de formalités douanières', which amounted to 3 per cent. of the value on imported goods and 2 per cent. on exports. Other new taxes included increased export duties on various commodities such as phosphate and barley.

Revenue for 1938, 1939, and 1940 was 704,151,400 francs, 802,631,060 francs, and 811,198,000 francs respectively, and expenditure in the same years was 704,061,680 francs, 802,535,002 francs, and 810,954,000 francs. The details of the budgets of 1937 and 1938 are given below.

Revenue

	1937 Thousands of francs	1938 Thousands of francs
Direct taxes	72,042	78,448
Indirect taxes	320,313	388,149
Receipts from monopolies and state industrial undertakings	169,079	185,555
Receipts from the Domain	16,200	15,700
Miscellaneous	33,686	36,299
Total of Ordinary Revenue . . .	611,320	704,151
Total of Extraordinary Revenue .	50,000	55,000
GRAND TOTAL	661,320	759,151

Expenditure

Department of Finance	297,236	352,857
Secretariat	31,566	97,680
Office of the Interior	32,086	..
Department of Agriculture and Trade .	28,785	29,539
Department of Education	65,734	76,035
Department of Public Works	71,572	89,354
Ministry of Justice	10,808	12,492
Post Office	37,442	41,710
Bey's army (Armée Tunisienne) . .	3,777	4,394
Administration of the Territoires militaires du Sud	32,186	..
Total of Ordinary Expenditure . .	611,192	704,061
Total of Extraordinary Expenditure .	50,000	55,000
GRAND TOTAL	661,192	759,061

Extra expenditure

Schools and educational establishments .	18,928	23,21
Hospitals and benevolent societies . .	12,435	15,281
Olive-tree administration (la Ghaba) .	843	1,122
Musée Alaoui at le Bardo	436	452
TOTAL	32,642	40,073

Taxation

Revenue is derived from direct and indirect taxes, monopolies, state domains and exploitations, and excise duties on sugar, tea, and motor spirit. Nearly half of the total comes from indirect taxation.

Receipts from direct taxation have steadily diminished from about one-third of the total to less than one-tenth. They are principally made up of personal and property taxes. The *istitan*, which has replaced the old capitation tax (*medjba*), is paid by all males residing in the country for more than ninety days. The *medjba* was paid only by Tunisian male subjects and Moslem foreigners, and as it was not a tax ordained by the Koran there was much evasion in payment. The second personal tax (*contribution personnelle d'État*) is based on income and is payable by men and women resident in Tunisia for more than ninety days. There are various taxes on agricultural property: they include the *kanoun* or tax on date-palms or olive-trees, the *achour* or tithe on cereals, the *mradjas* or tax on all other fruit-trees and crops not touched by the *achour*, and a tax on cattle and on vines, the latter payable by the producer and not the consumer. The inhabitants of the Île de Djerba pay a fixed sum or *khodor*, which they collect themselves; they are remitted from the tithe on cereals and olive-oil. Urban property is taxed on the rental, but is no longer payable in the communes. Patents, mining royalties, rents of enzel (p. 160), securities, and interest on credit are other sources of direct taxation.

Indirect taxes are obtained from stamp, statistics, and registration taxes, customs, shipping and lighthouse dues, and market dues. The last, formerly called *mahsoulats*, were levied on the manufacture and marketing of a number of commodities. They were farmed out, and as there was much abuse in their collection, were suppressed in 1920 and replaced by new dues on a wide range of such commodities as hides, meat, explosives, precious metals, alcohol, vinegar, sugar, tea, coffee, spices, and luxury articles. The monopolies in tobacco, matches, salt, gunpowder, and playing cards, the state exploitations of the railways and waterworks and of the mint, and the revenue from the domain provide the remaining sources of indirect taxation.

Loans

The total amount of loans issued by the Tunisian Government since 1880 is 2,242,232,655 francs at rates varying from 3 to 5 per cent.: 1,232,639,189 francs have been converted or repaid. The

4 per cent. perpetual loan of 1884 has been partially paid off, and the remainder converted. At the end of 1937 the Public Debt amounted to 1,009,593,000 francs, and the yearly charge for interest together with the sinking fund to 44,180,000 francs. The various departments such as the Post Office, the Public Works Department, and the Department of Agriculture and Trade have obtained loans privately from banks and semi-public bodies: most of these have been short-term loans which have not been placed on the market, and are consequently not quoted on the Paris Bourse. Their amount varies from time to time as they are either paid off or re-borrowed.

Regional Budgets

Revenue for the budgets of the five regions of Tunisia is obtained from 'centimes' added to the general taxes, special regional taxes, state subsidies, sums of money contributed by the communes, and loans. The only items of expenditure are public works and the cost of administration. The 'centimes' and additional taxes are levied in the same way as the other taxes and handed over to the different regions. The Treasurer-General has control of all receipts and expenditure.

Banking

The two principal banks in Tunisia are the Banque de l'Algérie and the Banque de Tunisie. The Banque de l'Algérie was founded in 1851 and is a state establishment with the same standing and functions in Algeria and Tunisia as the Banque de France. It has a capital of 20 million francs. The main branches are at Tunis, Sfax, Sousse, Béja, and Bizerta. The Banque de Tunisie, which has a capital of 16 million francs, has its main offices in Tunis and Sfax, and branch offices at Béja, Bizerta, Ferryville, Kairouan, le Kef, Mateur, Medjez el Bab, Monastir, Nabeul, Souk el Khemis, and Sousse.

The other large banks in the country are the Crédit foncier d'Algérie et de Tunisie, founded in 1881, the Banque Franco-Tunisienne de Prêts immobiliers, which is similar to the Mont de Piété in Paris, and the Banque industrielle de l'Afrique du Nord: all these are primarily loan banks for farmers. There are several French banks with branches in Tunisia, including the Comptoir national d'Escompte, the Société Générale, the Crédit Lyonnais, and the Société Marseillaise de Crédit industriel, commercial, et de dépôts. There are two Italian banks established in Tunisia, the Banca Italiana di Credito

and the Banco Italo Tunisino di Credito Agrario, and also the Ottoman Bank, but no British banks. Besides these there are various smaller banks such as the Banque de Prêts fonciers, the Caisse régionale de Crédit, the Caisse régionale de Crédit agricole mutuel, the Cooperative Tunisienne de Crédit, and the Société Tunisienne

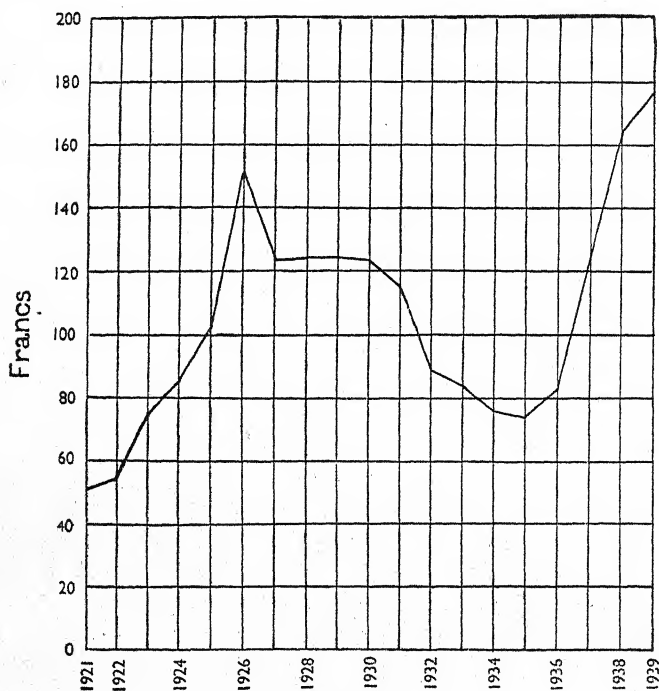


FIG. 69. *The value of the £ sterling in francs, 1921-1939*

de Banque et de Crédit. Many natives go to the native money-lenders, who, as in other Moslem countries, charge high rates of interest, with ensuing bankruptcies in years of bad harvest.

Currency

The currency is based upon the French franc, the fluctuations of which it follows (Fig. 69). There is no Tunisian bank of issue, but the Banque de l'Algérie at Algiers issues notes for the Tunisian Government. This concession was granted in return for a perpetual loan of 4 million francs to the Tunisian Government. Notes of the Banque de France are also accepted at par, but there are very few in

the country. The note circulation comprises notes of 1,000, 500, 50, 20, and 5 francs issued by the Banque de l'Algérie with the overstamp of 'Tunisie'. Silver coins of a nominal value of 20, 10, and 5 francs are issued; legal tender for such coins is fixed at 250 francs. There are aluminium bronze coins of 2 francs, 1 franc, and 50 centimes, nickel coins of 25, 10, and 5 centimes, and bronze coins of 10, 5, 2, and 1 centimes. French coins are also accepted at par.

CHAPTER XV

ROADS

General

BEFORE the establishment of the Protectorate there were only a few miles of metalled road in the neighbourhood of Tunis: elsewhere there were tracks, of which the location varied with the seasons of the year. Now there is an extensive network of first-class roads joining all the principal towns and connecting with the Algerian road system.

The system has been almost completely rebuilt since 1919 and is, therefore, of modern construction: there are about 3,730 miles (6,000 km.) of roads, of which approximately a quarter have concrete or tarred surfaces (e.g. Photos. 198, 205), and also about 8,700 miles (14,000 km.) of light roads and 3,730 miles (6,000 km.) of tracks (e.g. Photos. 55, 200, 212). Most of the main roads are metalled and tarred, generally referred to as 'tarmac', but a few are concreted. Secondary roads in northern Tunisia are generally of waterbound macadam construction. Roads in the Cap Bon peninsula are constructed of clay and gravel or similar foundation and finished with a bituminous dressing. Some of the tracks in south-central and southern Tunisia are constructed of a foundation of stones or branches, on which is laid a layer of gravel or clay and sand: the whole is watered and pounded.

In parts of central and southern Tunisia the surface consists of hard crusts, firm sand, and other materials providing good cross-country going. The chotts are covered by a crust of salt and earth, which varies in depth, while the bearing power of the crust changes with the season.

Immediately before the present war work was in hand to improve the tracks both as regards foundation and surface: this would improve their durability, capacity to withstand load, and all-weather performance. Usually the tracks, or stretches of them, become impracticable during the rainy season or after heavy rains: but these conditions are matters of local information and many tracks, especially in southern and south-central Tunisia, may be passable even in winter.

The effects of active warfare in north Africa were firstly to impose heavy wear-and-tear on the strategic and some other roads and tracks, and secondly to stimulate repair and maintenance as well as new construction: north Africa having become a less active theatre of war,

neglect of some roads and tracks, no longer in full use, must be expected. Finally, the system is likely to be restored to its pre-war state, with the addition of war-time improvements beneficial to peace-time needs. The following description of the system is, therefore, incomplete and is intended solely to give a general view: it is in no sense an itinerary and should not be used as such, nor should the classification used here be taken as a final statement on the subject.

Engineering works are numerous and well constructed in northern and north-central Tunisia: the bridges generally take only one line of traffic, and their average load is 25 tons. Farther south, where the roads for the most part run over flat country, little attempt has been made to bridge the oueds; instead 'Irish bridges' (French *cassis*) and fords are found. 'Irish bridges' imply that the road surface is continued across the bed of the oued and is, therefore, under water and perhaps impassable when the oued is flowing. Wind-blown sand presents a considerable problem along some roads and tracks. Palm-leaf and other screens may be used, and clearing is necessary in bad stretches at certain times. In general, roads and tracks skirt large dunes, but they are commonly carried over small and low-lying areas of sand on branches of drinn or on stones.

Classification. The classification adopted by the French in Tunisia is as follows:

- (a) *Routes de grand parcours* or main roads, indicated by P on the map in the pocket at the end of the book, ranking with the Routes Nationales of Algeria and metropolitan France.
- (b) *Routes de moyenne communication* or secondary roads, indicated by C on the map.
- (c) *Pistes* or tracks, which range from all-weather motor tracks to desert camel-routes generally passable to motor vehicles.

Road Network (Fig. 70)

The essential plan is simple: roads radiate from four coastal areas, namely the ports of Tunis, Sousse, Sfax, and Gabès, these four being joined by a coastal road which passes from the Algerian to the Libyan frontier. The network is fairly dense in the north and open in the south.

It will be shown below that, although the essential plan is as stated, there are in addition route-centres in the interior of Tunisia and

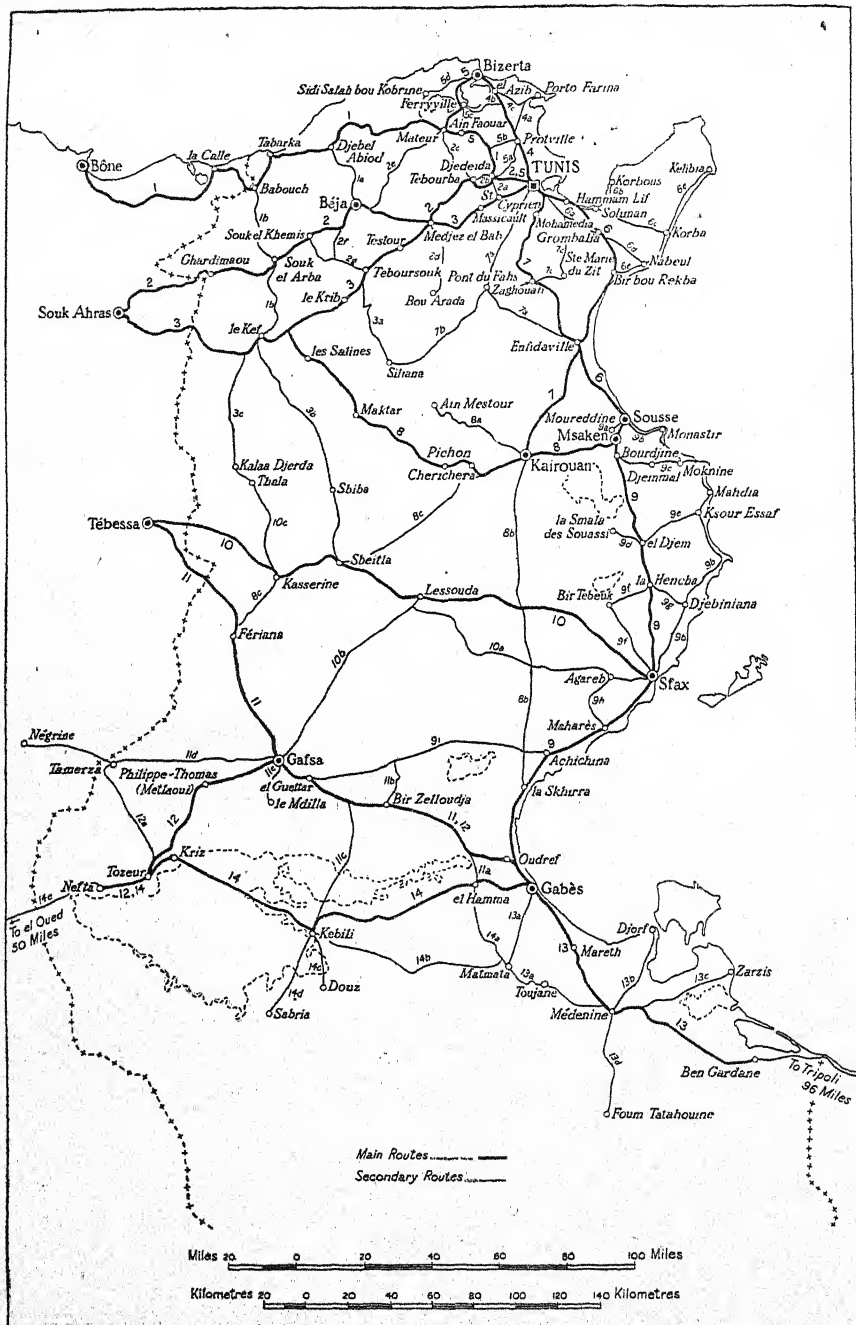


FIG. 70. The road network of Tunisia (excluding tracks in the south).
Routes are numbered as in the text

in eastern Algeria. In the following description emphasis is placed on the routes which start from the coastal towns and pass through route-centres into Algeria: it will be found that nearly all the place-names familiar in the Tunisian campaign of 1942-1943 are mentioned. It should be noted moreover that the network is almost entirely defined by the natural routes of eastern Barbary and the north-eastern Sahara as a whole: the presence of the Algerian-Tunisian boundary makes little difference to the plan. Even in the Tunisia-Libyan frontier region, where strategic considerations have been paramount, the network of tracks and military roads has a background of natural routes and ancient camel-tracks.

The essential points of convergence in Algeria are Souk Ahras, Tébessa, and the Souf oases (el Oued); more remote, and concerned solely with Saharan communications, are Ouargla, Fort Flatters, and the Fort Messaouda (Algeria)-Fort Saint (Tunisia)-Ghadames (Libya) group.

The principal route-centres within Tunisia include Mateur, Medjez el Bab, Béja, Souk el Arba, le Kef, Pont du Fahs, Enfidaville (near the coast), Kairouan, Sbeitla, Kasserine, Lessouda, Gafsa, Kebili, Médenine, Fom Tatahouine, and Ben Gardane (near the coast).

(i) *Roads radiating from Tunis.* Three good roads run from Tunis into Algeria: the coastal road passes through Djedeida, Mateur, and Tabarka to la Calle and Bône; the Tunis-Djedeida-Tebourba and the Tunis-Massicault roads converge on Medjez el Bab, whence one route leads through Béja, Souk el Arba, and Ghardimaou and the other passes through Teboursouk and le Kef, the two roads converging on Souk Ahras. Main roads join Bizerta to Mateur and to Tunis. The local road network round Tunis includes la Goulette.

From Tunis the coast road crosses the base of the Cap Bon peninsula through Grombalia and thence to Enfidaville, where it is joined by another road from Tunis through Pont du Fahs.

(ii) *Roads radiating from Sousse.* The coast road passes through Sousse from Enfidaville southward through Mahdia to Sfax. From Sousse a single main road runs inland to Kairouan, an important centre of communication joined in particular to Enfidaville, le Kef (via Pichon and Maktar), and Sbeitla. From Sbeitla roads lead to le Kef through Sbiba, and to Kasserine and Fériana, from both of which there are routes to Tébessa. From Fériana a road runs to Gafsa. From Sousse a main road leads due south through el Djem to Sfax.

(iii) *Roads radiating from Sfax.* From the port of Sfax the coast road skirts the Golfe de Gabès through Maharès to Gabès. Some fairly short roads run out from Sfax into the Sahel, and a route runs into the interior to Lessouda, thence to Sbeitla, the main road swinging south-westward to Gafsa: the route is continued through Philippe-Thomas to Tozeur, Nefta, and the Souf oases in the Algerian Sahara.

(iv) *Roads radiating from Gabès.* The coast road from Sfax passes through Gabès to Mareth, and thence to Médenine, a route-centre communicating with the Île de Djerba, Zarzis, the Libyan frontier (through Ben Gardane), and Fom Tatahouine. Tracks and military roads concerned with the frontier defences of Tunisia radiate from Ben Gardane and Fom Tatahouine. From Gabès roads lead inland to Gafsa and through el Hamma to Kebili. From Kebili tracks cross the chotts to join the Philippe-Thomas-Tozeur and Gabès-Gafsa roads, and others radiate from south-eastward to south-westward into the desert, to Fom Tatahouine, to the extreme south (Fort Saint and Ghadames), and to the Algerian Sahara (Souf oases, Touggourt, and Ouargla).

Summary of Routes

In the following summary the main routes leading from each of the four ports, Tunis, Sousse, Sfax, and Gabès, are described, followed by branches leading from each of them. Classification (P, C, or track) is based on the French Michelin map of 1939. The routes are shown in Fig. 70 and on the map in the pocket at the end of the book, and are listed below:

ROUTES RADIATING FROM TUNIS

1. TUNIS-BÔNE, via Djedeida, Mateur, Djebel Abiod, Tabarka, Babouch, la Calle.
 - 1a. Djebel Abiod-Béja.
 - 1b. Babouch-le Kef, through Souk el Arba.
2. TUNIS-SOUK AHRAS, via Djedeida, Tebourba, Medjez el Bab, Béja, Souk el Arba, Ghardimaou.
 - 2a. Djedeida-St. Cyprien.
 - 2b. Djedeida-Tebourba.
 - 2c. Tebourba-Mateur.
 - 2d. Medjez el Bab-Bou Arada.
 - 2e. Béja-Mateur.
 - 2f. Béja-Teboursouk.
 - 2g. Souk el Khemis-Teboursouk.

3. TUNIS-SOUK AHRAS, via Massicault, Medjez el Bab, Testour, Tebour-souk, le Krib, le Kef.
 - 3a. Teboursouk-Siliana.
 - 3b. Le Kef-Sbeitla, through Sbiba.
 - 3c. Le Kef-Kalaa Djerda.
4. TUNIS-BIZERTA, via Protville.
 - 4a. Protville-Porto Farina.
 - 4b. El Azib-Ferryville.
 - 4c. El Azib-Porto Farina.
5. TUNIS-BIZERTA, via Djedeida and Mateur.
 - 5a. Djedeida-Protville.
 - 5b. Sidi Athman-Protville.
 - 5c. Ain Faouar (Sidi el Bahill)-Tindja.
 - 5d. Mateur-Bizerta, through Sidi Salah bou Kobrine.
6. TUNIS-SOUSSE, via Hamman Lif, Grombalia, Enfidaville.
 - 6a. Tunis-Grombalia, through Crétéville.
 - 6b. Hammam Lif-Korbous.
 - 6c. Hammam Lif-Korba, through Soliman.
 - 6d. Grombalia-Nabeul.
 - 6e. Bir bou Rekba-Kelibia.
7. TUNIS-KAIROUAN, via Mohamedia, Zaghouan, Enfidaville.
 - 7a. Tunis-Enfidaville, through Pont du Fahs.
 - 7b. Pont du Fahs-Siliana.
 - 7c. Tunis-Zaghouan, through Ste. Marie du Zit.

ROUTES RADIATING FROM SOUSSE

8. SOUSSE-LE KEF, via Msaken, Kairouan, Cherichera, Pichon, Maktar, les Salines.
 - 8a. Kairouan-Ain Mestour.
 - 8b. Kairouan-la Skhirra.
 - 8c. Kairouan-Fériana, through Sbeitla and Kasserine.
9. SOUSSE-GABÈS, via Msaken, el Djem, Sfax, Maharès, la Skhirra.
 - 9a. Sousse-Moureddine.
 - 9b. Sousse-Sfax, through Monastir and Mahdia.
 - 9c. Bourdjine-Moknine, through Djemmal.
 - 9d. El Djem-la Smala des Souassi.
 - 9e. El Djem-Ksour Essaf.
 - 9f. La Hencha-Sfax, through Bir Tebeuk.
 - 9g. La Hencha-Djebiniana.
 - 9h. Sfax-Maharès, through Agareb.
 - 9i. Achichina-Gafsa.

ROUTES RADIATING FROM SFAX

10. SFAX-TÉBESSA, via Lessouda, Sbeitla, Kasserine.
10a. Lessouda-Agareb.
10b. Lessouda-Gafsa.
10c. Kasserine-Thala.

ROUTES RADIATING FROM GABÈS

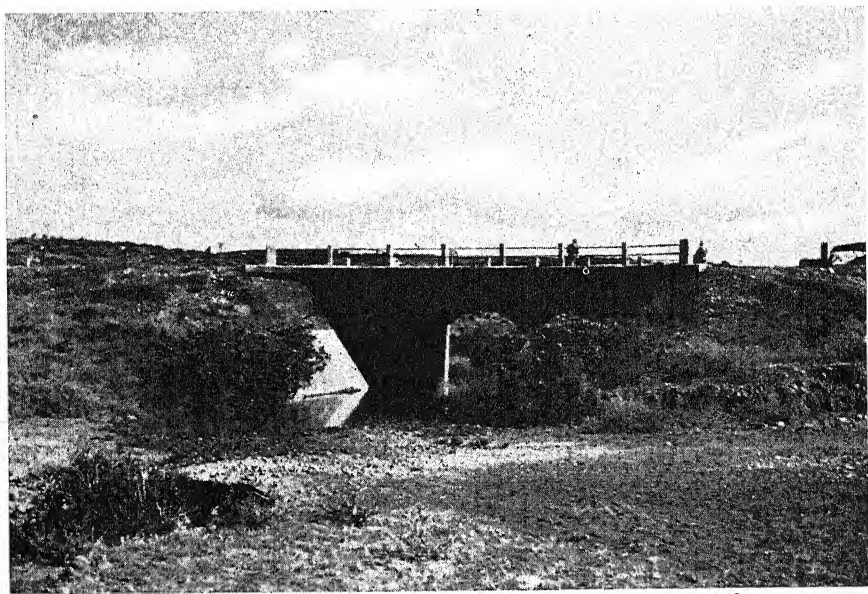
11. GABÈS-TÉBESSA, via Gafsa and Fériana.
11a. Oudref-el Hamma.
11b. Bir Zelloudja-el Guettar.
11c. El Guettar-Kebili.
11d. Gafsa-Tamerza.
11e. Gafsa-le Mdilla.
12. GABÈS-NEFTA, via Gafsa, Philippe-Thomas (Metlaoui), Tozeur.
12a. Tozeur-Tamerza.
13. GABÈS-BEN GARDANE, via Mareth and Médenine.
13a. Gabès-Toujane, through Matmata.
13b. Médenine-Djorf.
13c. Médenine-Zarzis.
13d. Médenine-Foum Tatahouine.
14. GABÈS-NEFTA, via el Hamma, Kebili, Kriz, Tozeur.
14a. El Hamma-Matmata.
14b. Kebili-Matmata.
14c. Kebili-Douz.
14d. Kebili-Sabria.
14e. Nefta-el Oued (Souf oases).

DESCRIPTION OF ROUTES

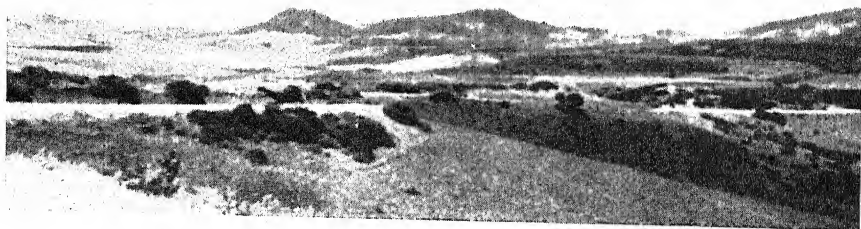
THE fourteen main routes of the country are described in turn, followed by the subsidiary routes associated with each, in numerical order. That is, Route 1 is first described, all principal places through which it passes being given, followed by the classification letters (P, C) and road numbers of the Michelin map, although some roads and tracks are neither classified nor numbered. Other routes which leave it are then given in turn by their numbers, and will be found described in the text under those numbers (i.e. Route 5c is not described as a branch of Route 1): subsidiary routes with the same number as the main route under consideration (1a, 1b) are briefly described.



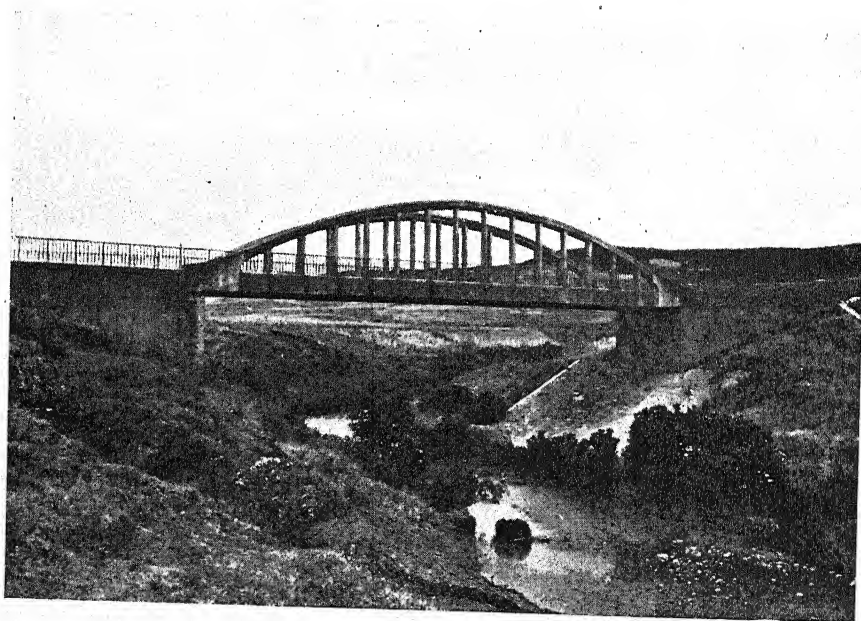
193. *Bridge near Mateur (Route 1)*



194. *Bridge near Djalta (Route 1)*



195. *Country near el Aouana (Route 1)*



196. *Bridge near Nefsa (Route 1)*

Road surfaces and foundations, and crossings of oueds and railways, are as recorded before the campaign of 1942-1943.

ROUTES RADIATING FROM TUNIS

1. TUNIS-BÔNE, via Djedeida, Mateur, Djebel Abiod, Tabarka, Babouch, la Calle. 184½ miles (297 km.). P. 7 and P 17; N. 12 in Algeria (Photos. 193-196).

This is the main road between Tunis and north-eastern Algeria. It follows the railway from Tunis to Tabarka and from la Calle to Bône. It runs through agricultural country to Mateur, beyond which it is narrow and sinuous. It passes along a fertile valley in hilly country and descends to Djebel Abiod: thereafter it goes through the agricultural centre of Ouchtata. It then crosses country wooded on the south and with partly vegetated sand-dunes on the north, to Tabarka. The road continues through hilly and wooded country and winds through a steep defile to Babouch, beyond which it descends steeply through forests to la Calle. Thence it climbs through a ravine, crosses several oueds, and enters a fertile and well-cultivated plain to reach Bône. Seven of the nine principal bridges are in the last 43 miles (70 km.). Of the other bridges one crosses the Medjerda and is a restored Roman structure, 15 miles (24 km.) from Tunis (Photo. 15), and the other is an iron bridge across the Oued Djoumine, 40 miles (64 km.) from Tunis. The road is metalled and tarred almost throughout, but in the past has been less well constructed and maintained beyond Mateur.

Other routes leaving Route 1: 2, 5, 5c, 2e, 1a, 1b.

- 1a. DJEBEL ABIOD-BÉJA, 24 miles (39 km.), P. 14, connects Routes 1 and 2 and is a tarred road through hilly country.

1b. BABOUCH-LE KEF through Souk el Arba, 56½ miles (91 km.), P. 17 and P. 17^{et}, connects Routes 1, 2, 3, and 8 (Photo. 22). It is tarred and well surfaced and is very hilly south of Babouch, with many sharp corners. There is no information as to its condition south of Souk el Arba, where it crosses the Oued Mellègue and climbs to the High Tell.

2. TUNIS-SOUK AHRAS, via Djedeida, Tebourba, Medjez el Bab, Béja, Souk el Arba, Ghardimaou. 159 miles (256 km.). P. 7, C. 40, C. 64, and P. 6; N. 21 in Algeria (Photos. 197-199).

The road follows the valley of the Oued Medjerda, for the most part through agricultural land. The section from Tunis through

Djedeida and Tebourba to Medjez el Bab is an alternative to the Tunis-Massicault-Medjez el Bab road (Route 3). The route is followed by the railway almost throughout, and the two cross at several points. Gradients are fairly steep between Oued Zarga and Béja, between which the road leaves the floor of the Medjerda valley: there is a maximum gradient of 1 in 8 near Béja. From Béja the road returns to the Oued Medjerda and follows it, crossing the river and some of its tributaries on the way to Ghardimaou through Souk el Khemis and Souk el Arba. The road is suitable for fast travel west of Souk el Arba. For the first few miles beyond Ghardimaou the road passes through the level Medjerda plain and then rises rapidly, with several difficult corners, through olive-groves to the Algerian frontier (Photo. 199). Thence it climbs through bush-covered country, reaching a height of 2,950 feet. It then descends 'en corniche' and continues, with sharp corners, rising and falling to Souk Ahras. It is a first-class road, with stone foundations and tarred surface: it crosses the Oued Medjerda three times, as well as several other oueds, by strong bridges.

Other routes leaving Route 2: 1, 5, 2a, 2b, 2c, 2d, 2e, 2f and 1a, 2g, 1b.

2a. DJEDEIDA-ST. CYPRIEN, $7\frac{1}{2}$ miles (12 km.), links Routes 2 and 3.

2b. DJEDEIDA-TEBOURBA, 6 miles (10 km.), a northerly alternative to that given in Route 2, passes through open country with low hills for the first half of the distance, and then through olive-groves. The Medjerda is crossed at Djedeida on Route 1, and the railway by a level-crossing.

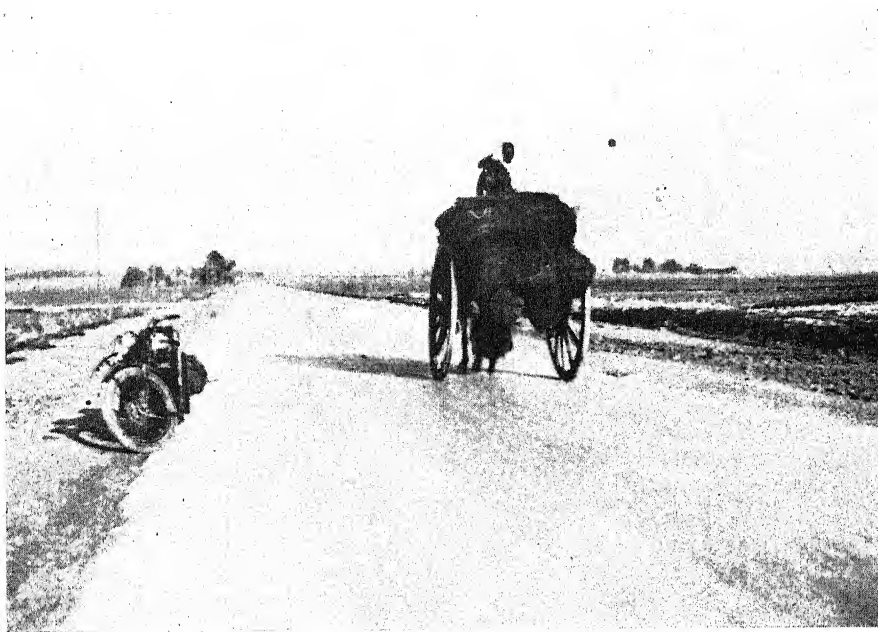
2c. TEBOURBA-MATEUR, 19 miles (31 km.), C. 55, connects Routes 1 and 5. The road runs north-westward from Tebourba through cultivated land and then climbs over a pass, after which it descends into the valley of the Oued Tine, which it crosses by a stone bridge. It continues, with marsh on the east, to the crossing of the Oued Djoumine, also by a bridge.

2d. MEDJEZ EL BAB-BOU ARADA, 20 miles (32 km.), P. 15 and C. 63, runs south through brush-covered country to the fertile plain of Goubellat, and thence to Bou Arada, which lies among pasture land and olive-groves.

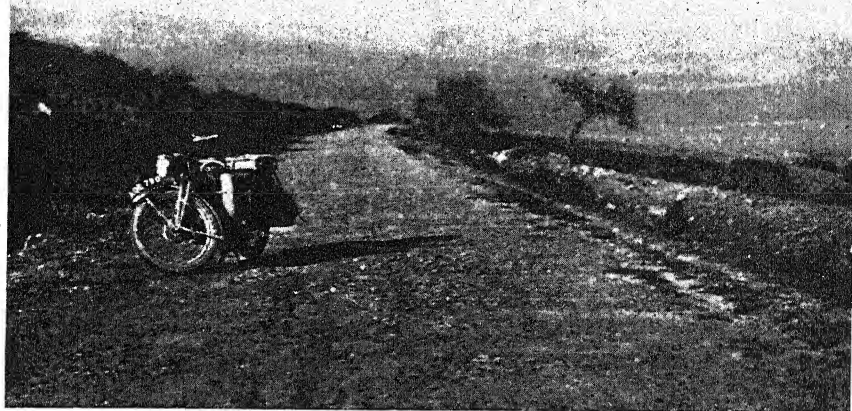
2e. BÉJA-MATEUR, $45\frac{1}{2}$ miles (73 km.), P. 12, connects Route 2 with Routes 1 and 5. For the first 6 miles (9 km.) the road follows Route 2 and then strikes north through Munchar to join the normal-gauge Béja-Mateur railway. The two run together down a tributary of the Oued Djoumine, which they then follow to Mateur.



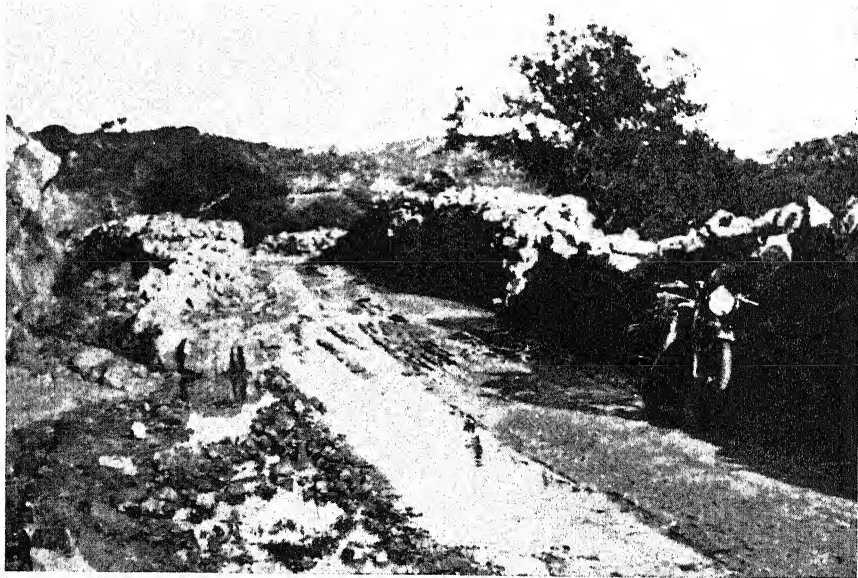
197. Bridge over the Oued Medjerda at Medjez el Bab (Routes 2 and 3)



198. Road between Medjez el Bab and Béja (Route 2)



199. *Road west of Ghardimaou (Route 2)*



200. *Mountain track in northern Tunisia near Algerian boundary*

2f. BÉJA-TEBOURSOUK, 29 miles (47 km.), P. 6, C. 68^e, and C. 68, links Routes 2 and 3. The road follows Route 2 for 7 miles (11 km.), and then turns south to cross the Oued Medjerda by a bridge, and the railway near Sidi Smail. Thence it climbs steeply and sinuously over the hills to Thibar before joining Route 2g and winding fairly steeply over the slopes of Djebel Goraa. Thence it descends to cross two small rivers before entering Teboursouk.

2g. SOUK EL KHEMIS-TEBOURSOUK, 25 miles (40 km.), C. 68^e and C. 68, links Routes 2 and 3. It crosses the Medjerda by a bridge on Route 2 and then strikes south-east and runs across the river plain, crossing the railway, until it joins the road from Béja to Teboursouk (Route 2f).

3. TUNIS-SOUK AHRAS, via Massicault, Medjez el Bab, Testour, Teboursouk, le Krib, le Kef. 153½ miles (247 km.). P. 5; C. 30 in Algeria (Photo. 197).

The road runs through cultivated plains, with some hills as far as Medjez el Bab: thence to Teboursouk it first follows the Medjerda, then crosses the Oued Siliana and enters hilly country to the Oued Kralled, beyond which it continues through open country and olive-groves. From Teboursouk it winds along an open pastoral valley, passes through le Krib, crosses the Oued Tessa, runs in a defile between Djebels Barkane and Kebbouch, and, after crossing plains, rises steeply to le Kef. Beyond le Kef the road becomes hilly, particularly near the Algerian frontier, where it rises to 2,635 feet.

It is a first-class tarred road from Tunis to Medjez el Bab and is, for the most part, good beyond the town. There are gradients of about 1 in 13 between Testour and Teboursouk and sharp hilly stretches between le Kef and Souk Ahras. The main crossings of the large oueds are by stone or iron bridges (three crossings of the Oued Medjerda, the last near Souk Ahras, also the Oueds Siliana, Kralled, Tessa, Ramel, and Mellègue).

Other routes leaving Route 3: 2a, 2, 2d, 2f and 2g, 3a, 8, 1b, 3b, 3c.

3a. TEBOURSOUK-SILIANA, 30 miles (48 km.), P. 5 and C. 66, branches off Route 3 about 6 miles (9 km.) south-west of Teboursouk to cross the eastern side of the plain of le Krib. It then passes through hilly country to reach the left bank of the Oued Siliana, which it follows to Siliana.

3b. LE KEF-SBEITLA, through Sbiba, 76 miles (122 km.), P. 21, leaves Route 3 on the outskirts of le Kef to pass over the Oued Tine by a bridge, whence it climbs to a plateau. It crosses the Tunis-

Tébessa railway and continues through the hill-and-valley country of the Oued el Hathob basin (crossing the Oued el Babouch by a bridge) to Sbiba, whence it traverses a plateau and descends the valley of the Oued Ramel to Sbeitla.

3c. LE KEF-KALAA DJERDA, 37 miles (60 km.), P. 5 and P. 23, follows Route 3 to the crossing of the Oued Ramel (by a bridge) and then soon strikes south across open hilly country to Tadjerouine: it then passes over the Oued Sarrath by a bridge and continues over open country to Kalaa Djerda. This road crosses two branch lines of the Tunis-Tébessa railway. From Kalaa Djerda a road runs to Thala connecting there with Route 10c.

4. TUNIS-BIZERTA, via Protville. 40 miles (64 km.). P. 8 (Photos. 201, 202).

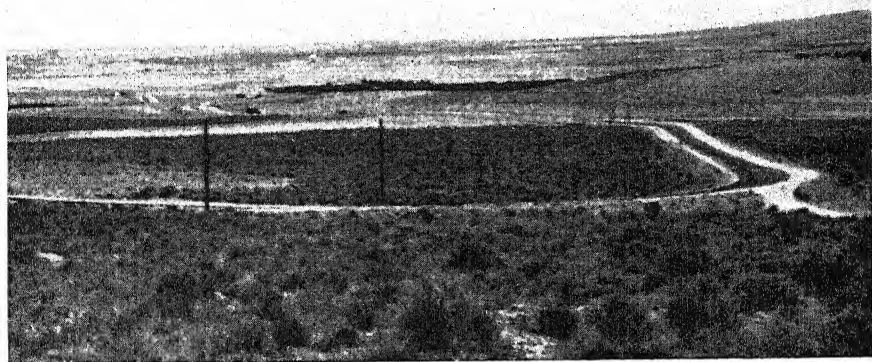
This is a broad, flat, first-class tarred road running first through olive-groves to la Sebala, where it enters a marshy plain and then open agricultural country, crossing some small hills before descending to Protville. Here the Oued Medjerda is crossed by a stone hump-backed bridge. Thence the road continues over a flat agricultural plain to the crossing of the Oued ech Cherchara by a bridge, and climbs steeply over Djebel Menzel Roul. It descends to another marshy plain, where the road is liable to be flooded, rises over spurs of Djebel Kechabta, and falls by a series of hairpin bends towards the Lac de Bizerte. The main road runs through vineyards and groups of trees to approach the lake at el Azib: it skirts the north-eastern shore, by-passing Menzel Djemil. It then rises through olive-groves over the ridge which separates the lake and the sea, and descends through sand-hills to the ferry across the Chenal de Bizerte (p. 244; Photo. 202).

Other routes leaving Route 4: 4a, 4b, 4c.

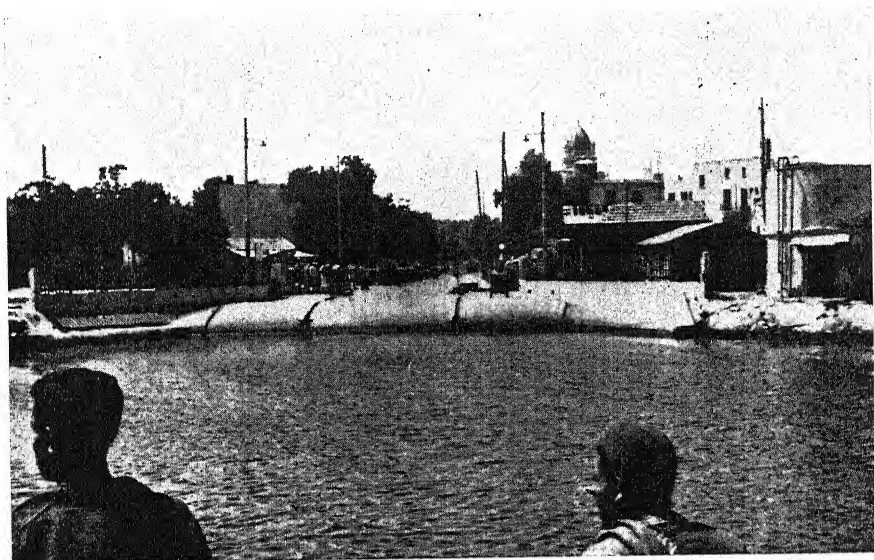
4a. PROTVILLE-PORTO FARINA, 20 miles (32.5 km.), P. 8 and C. 51, branches east from Route 4 about 8 miles (12.5 km.) north of Protville and skirts the northern side of the marsh at the mouth of the Oued Medjerda to join the road from Bizerta to Porto Farina (4c). It continues along the northern shore of the Lac de Porto Farina to Porto Farina.

4b. EL AZIB-FERRYVILLE, $17\frac{1}{2}$ miles (28 km.), P. 8 and C. 53, branches off Route 4 and runs along the foot of the hills on the southern side of the Lac de Bizerte to Ferryville.

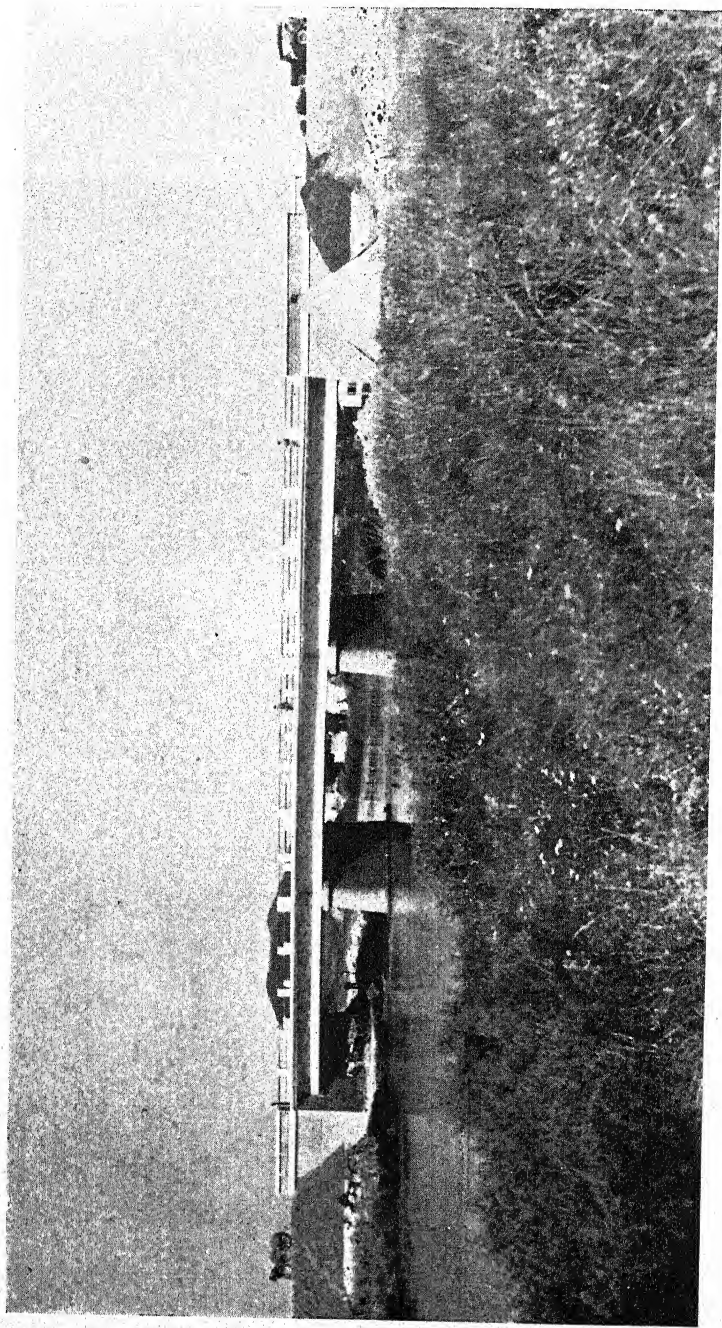
4c. EL AZIB-PORTO FARINA, 16 miles (26 km.), C. 52 and C. 51, runs south-east from el Azib to el Alia, crossing the southern spurs of Djebel Hakima to join Route 4a, which runs to Porto Farina.



201. *Road climbing spurs of Djebel Kechabta (Route 4)*



202. *Ferry-crossing of the Chenal de Bizerte*



203. Bridge over the Oued Tindja (Route 5)

5. TUNIS-BIZERTA, via Djedeida and Mateur, $63\frac{1}{2}$ miles (102 km.), P. 7 and P. 12 (Photo. 203).

This is a first-class metalled road with a tarred surface crossing flat, open country, mainly agricultural, and following the railway. The route follows P. 7 as far as Mateur (Route 1). The direct road to Bizerta, P. 12, turns sharply north on the outskirts of Mateur without entering the town or crossing the Oued Djoumine and follows the railway down that valley: later, it follows the Oued el Melah and crosses the railway by a level-crossing at the south-eastern corner of the Garaet Achkel. Thereafter it runs north-east to join Route 5c. Turning north, the road descends towards the isthmus which separates the Lac de Bizerte from the Garaet Achkel, and so to Tindja. The road crosses the Oued Tindja (fordable in the dry season) by a bridge and joins Route 5d; thence it skirts the northern side of the Lac de Bizerte, passing Karouba to enter Bizerta.

Other routes leaving Route 5: 1 and 2, 5a, 5b, 5c, 5d, 5e, 4b, 5d.

5a. DJEDEIDA-PROTVILLE, $20\frac{1}{2}$ miles (about 33 km.), branches off Route 5 about 6 miles (10 km.) east of Djedeida and runs round the slopes of Djebel Amar to Sidi Tabet and so north through an open agricultural plain to Protville.

5b. SIDI ATHMAN-PROTVILLE, 8 miles (about 13 km.), C. 64, crosses the railway at Sidi Athman, and then runs north-east across the marshland of the Garaet el Mabtouha to Protville: it may be impassable in wet weather.

5c. AIN FAOUAR (SIDI EL BAHILL)-TINDJA, $10\frac{1}{2}$ miles (17 km.), C. 54 and P. 12, is a shorter alternative route to that given under Route 5. It strikes north from Route 5 at Ain Faouar and runs over hills to rejoin it $2\frac{1}{2}$ miles (4 km.) south of Tindja. From this junction another side-road runs north-north-east to Ferryville.

5d. MATEUR-BIZERTA, through Sidi Salah bou Kobrine, 33 miles (53 km.), P. 7, C. 57, and P. 11, follows Route 1 for 6 miles (10 km.) north-west of Mateur. It then strikes north, crossing a few small rivers and skirting the western side of the Garaet Achkel to the crossing of the Oued Sedjenane at Sidi Salah bou Kobrine. Thence it skirts the northern side of the Garaet Achkel to join Route 5, and so reaches Bizerta. It is the longer alternative route from Mateur.

6. TUNIS-SOUSSE, via Hammam Lif, Grombalia, Enfidaville. $89\frac{1}{2}$ miles (144 km.). P. 1 (Photos. 204, 205).

This is a first-class road which runs through almost flat country with many rich vineyards and occasional olive-groves as far as Bir bou

Rekba (Photo. 205). Thence to Enfidaville the country is generally bare and marshy, with occasional vineyards and olive-groves. From Enfidaville the road at first runs over open steppe country, but later becomes hilly and winding and runs through olive-groves as it approaches Sousse. Crossings of the numerous oueds are by 'Irish bridges' (p. 365) or by constructed bridges: the latter, mostly of steel, are located at the crossing of the Oued Miliane, and at Hammam Lif, Bou Arkoub, and the crossings of the Oueds Batene, Cherchar, es Saad, Moussa, and el Hammam. There are several crossings of the road and railway, both by bridges and level-crossings. The road has a concrete surface between Tunis and Hammam Lif, beyond which it is tarmac.

Other routes leaving Route 6: 6a, 6b, 6c, 6d, 6e, 7, 9.

6a. TUNIS-GROMBALIA, through Crétéville, $23\frac{1}{2}$ miles (38 km.), C. 34, is a hilly but fair road following Route 7c to la Cebala du Mornag, whence it strikes south-east to Crétéville, following the valley between Djebel bou Kournine and Djebel Ressas.

6b. HAMMAM LIF-KORBOUS, 20 miles (32 km.), P. 1 and P. 9, follows Route 6 to Bordj Cédria and then branches left, crossing the Oued es Soltane by a stone bridge to Soliman. Thence it turns towards the sea, passing through olive-groves and, after crossing the Oued Bezirck, reaches the coast and runs 'en corniche' along the eastern shore of the Golfe de Tunis on the side of an escarpment, to Korbous, which lies in a ravine opening to the sea. The road is metalled and has no severe gradients (Photo. 206). About $5\frac{1}{2}$ miles (9 km.) south of Korbous a good road leads north-eastward to Zaouiet el Mgaiz and is continued as a track to Cap Bon.

6c. HAMMAM LIF-KORBA, through Soliman, $33\frac{1}{2}$ miles (54 km.), P. 1, P. 9, and C. 44, follows Route 6b to Soliman, and from there is a motorable track through olive-groves. It passes to Menzel bou Zelfa and Beni Khaled and then to Sidi Tsabet on a plateau, whence the track descends to join Route 6e.

6d. GROMBALIA-NABEUL, $17\frac{1}{2}$ miles (28 km.), P. 1 and P. 10, follows Route 6 to Turki, where it branches left and rises over hills overlooking the sea; it descends to Nabeul.

6e. BIR BOU REKBA-KELIBIA, 49 miles (79 km.), P. 1, P. 15, and P. 10, is a good road, but the bridges are limited to 2 tons. It branches left from Route 6 and runs east to Hammamet, whence it runs parallel to, but mainly out of sight of, the coast to Nabeul. From here it crosses the headland of Ras Maamoura and follows the inland shore of salt lagoons to Korba, where it crosses a oued. Thence it continues

to Sidi Atsmane, where the Oued Chiba is crossed. Thereafter it turns slightly inland and climbs brush-covered slopes to cross a oued. Beyond Menzel Temime it returns to the shore and crosses two more oueds to reach Kelibia. A track from Kelibia leads to Cap Bon.

7. TUNIS-KAIROUAN, via Mohamedia, Zaghouan, Enfidaville. 97 miles (156 km.). P. 2, P. 3, C. 36, and P. 2.

As far as Enfidaville this is an alternative to Route 6. For long stretches it runs alongside the ruins of the Roman aqueduct to Carthage and the modern ground-level pipe-line to Tunis. After leaving Tunis it skirts the eastern edge of the Sebkret es Sedjoui, climbs through olive-groves to Mohamedia, and then descends to the valley of the Oued Miliane, which it crosses by a stone bridge. Thence it winds gently over the eastern spurs of Djebel Oust and descends to a flat plain. Passing through Moghrane it crosses the Oued Kerara by a bridge to reach Zaghouan. It skirts the mountains of Djebel Zaghouan, crosses the Oued el Hammam by a bridge, and runs through hills to the gorge of Takrouna, leaving the village on the right (Photo. 24). From here it passes through a well-watered plain, largely devoted to wheat-growing, to Enfidaville, whence it runs through open steppe to enter olive-groves near Kairouan (cf. Photo. 209). It is a good road, tarred or with a stone surface: the gradients are fairly steep between Zaghouan and Enfidaville. After rains the section Enfidaville-Kairouan may be cut by running water in several places.

Other routes leaving Route 7: 7c, 7a, 7c, 7a, 6.

7a. TUNIS-ENFIDAVILLE, through Pont du Fahs, $64\frac{1}{2}$ miles (about 104 km.), C. 37 and P. 3, is a good alternative to Route 7. Running over low ground outside Tunis, skirting the north-western edge of the Sebkret es Sedjoui, it crosses the aqueduct and climbs sinuously over hills before descending to the valley of the Oued Miliane. It runs parallel to the river, which is about 2 or 3 miles (3 to 5 km.) to the east, passes through Bir Mcherga, and then crosses the Miliane and the railway in Pont du Fahs. From here it runs south-east and follows the valley of the Oued ech Chair to Bir Ouled Aguil. Then it crosses the Ain Djougar-Tunis aqueduct and, skirting the southern slopes of Djebels Zaghouan and Zriba, winds along a valley to join Route 7 by which Enfidaville is reached. Some local roads branch from it.

7b. PONT DU FAHS-SILIANA, $40\frac{1}{2}$ miles (65 km.), P. 4, crosses the Oued ech Chair and then the Oued el Kebir by a bridge and runs southward across the plain of Pont du Fahs. Then it rises through wooded country and falls to the valley of the Oued el Kebir, which it

follows upstream to Robâa. Thence it descends into the valley of the Oued Siliana to Siliana (Photos. 207, 208).

7c. TUNIS-ZAGHOUAN, through Ste. Marie du Zit, 40½ miles (65 km.), C. 34, C. 35, and P. 15, crosses the Oued Miliâne by a bridge and then runs over the plains of the Mornag, one of the richest districts of Tunisia, to the lead mines of Djebel Ressayas. After leaving la Laverie at the foot of Djebel Ressayas it runs through hilly country for the rest of the way, ascending the valley to Sidi Salem, descending the valley of the Oued Zit to Ste. Marie du Zit, and then turning west along the slopes of the hills. Finally it crosses the Oued bou Selim by a bridge and continues to Zaghuan.

ROUTES RADIATING FROM SOUSSE

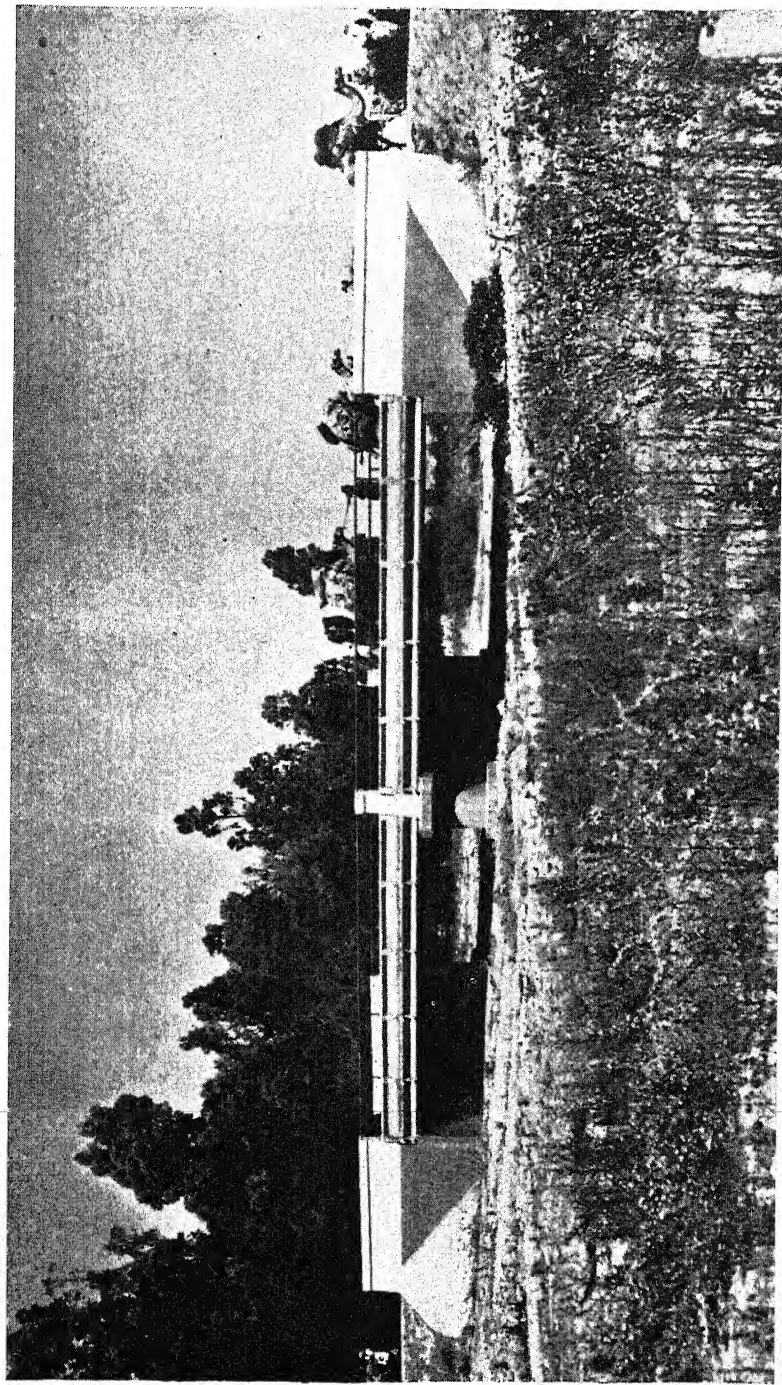
8. SOUSSE-LE KEF, via Msaken, Kairouan, Cherichera, Pichon, Maktar, les Salines. 141½ miles (228 km.). P. 1, C. 88°, P. 17, P. 3, and P. 17.

The road leaves the olive plantations of Sousse to pass over flat, open country with occasional olive-groves as far as Kairouan, after which it runs over flat country to Pichon. The country here is a mixture of brush, olive-trees, and scrub. The road passes through the steep gorges of the Oued el Kerd into the forest of Kesra, which extends for 7½ miles (12 km.): there is then a winding descent to the crossing of the Oued el Ousafa (the upper reaches of the Oued Siliana), beyond which lies Maktar. Thence the road continues through hilly country, mostly bare, passing the fertile plain of le Sers, where the Oued Tessa is forded. Beyond le Sers the road continues over hilly country through les Salines to the crossing of the Oued Ramel. Finally it joins the Tunis-le Kef road (Route 3). Crossings of oueds are for the most part by 'Irish bridges' (p. 365), and there are some fords: these crossings may be impassable or dangerous after rain.

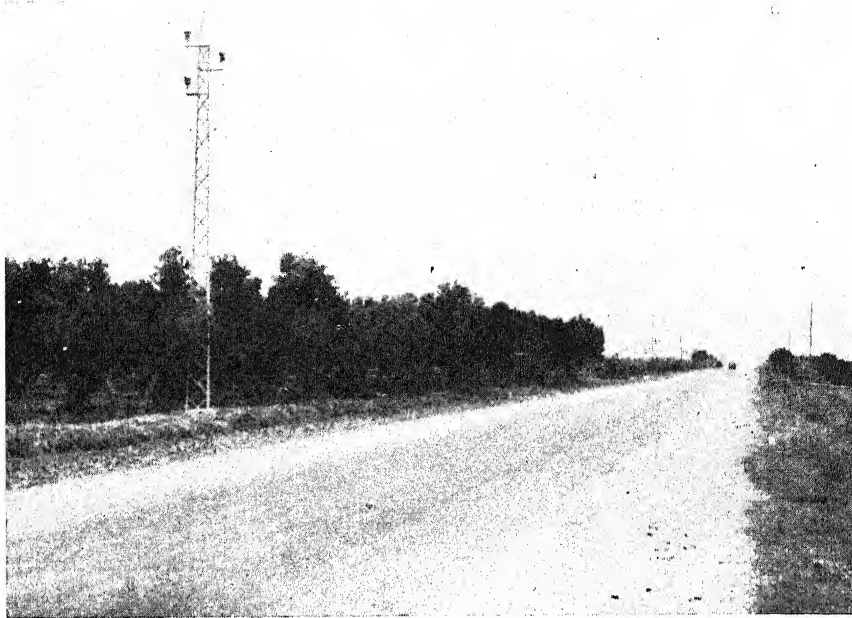
Other routes leaving Route 8: 9, 7, 8a, 8b, 8c, 3.

8a. KAIROUAN-AIN MESTOUR, 34 miles (55 km.), is a metalled road running north-west from Kairouan over level country for half the way and then entering a valley between the wooded hills of Djebel Ousselat on the south and Djebel bou Dabouss on the north. Winding between these hills it descends to Ain Mestour, which is flanked to the north-west by the high and steep Djebel Serdj (4,400 ft.). Numerous tracks radiate from Ain Mestour (Photo. 210).

8b. KAIROUAN-LA SKHIRRA, 100 miles (161 km.), P. 18 and P. 19, is a stone-surfaced track running across flat, monotonous, barren



204. Bridge over the Oued es Saad at Bou Ficha (Route 6)



205. *Road between Tunis and Hammam Lif (Route 6)*



206. *Cap Bon peninsula: road near Korbous (Route 6 b)*

country. It passes through Oglet Chouhaia, where there are wells, and crosses the road from Sfax to Tébessa (Route 10) and the line of the projected Sfax-Sbeitla railway (p. 394), and later the railway from Sfax to Gafsa. La Skhirra is on the shore of the Golfe de Gabès.

8c. KAIROUAN-FÉRIANA, through Sbeitla and Kasserine, 118½ miles (191 km.), P. 3, P. 3°, P. 20, and P. 23, follows Route 8 for 15½ miles (25 km.). It then branches left through the valley of the Oued Merguellil and across a flat plain between Djebel Trozza on the west and Djebel Touil on the east. It deteriorates into a track at about the crossing of the Oued el Hathob to reach Hadjeb el Aioun, where there are abundant springs. The track then runs south-west across monotonous desert between Djebel Mrhila on the west and Djebel Nara on the east to Sbeitla, and follows Route 10 to Kasserine. About 2½ miles (4 km.) beyond Kasserine it crosses the Oued ed Durb and strikes off to the south-west to cross the plateau between Djebel Chambi on the north-west and Djebel Selloum on the south-east. It passes Megdoudeche railway station and then climbs over rugged country, full of deep ravines and covered with alfa grass, to Thélepte. Here it joins the road from Gafsa to Tébessa (Route 11), and the road descends to Fériana.

9. SOUSSE-GABÈS, via Msaken, el Djem, Sfax, Maharès, la Skhirra. 168 miles (270 km.). P. 1.

This is a first-class road, a continuation of Route 6, following the railway almost throughout its length and crossing it several times. The olive-groves of the Sahel of Sousse thin out at about Bourdjine and the road runs through a little-cultivated stretch, suitable for sheep-raising, until at Kerker it rises on to a plateau and runs straight towards el Djem (Photos. 85, 87). El Djem is surrounded by olive-groves and cultivated land. The road continues through open country to la Hencha, from which it runs through a low-lying area flooded in the wet season, and across which is a railway bridge 1,422 yards (1,300 metres) long. Thence it continues over open country to the olive-groves which begin about 6 miles (9 km.) from Sfax. The road by-passes the town and follows the sea-shore, which is bordered by lagoons; it then cuts inland through gardens for about 7½ miles (12 km.), before rejoining the shore, which it follows, leaving Nakta on the left, to Chaffar railway station. It then reaches Maharès, which is surrounded by gardens and plantations and dominated by an old fortress. From Maharès it leaves the railway and follows the coast,

running first through plantations for about 12 miles (20 km.), and then through steppe-desert to Achichina, a village surrounded by young plantations at the edge of the Sebkret el Bahar. Here the road rejoins the railway and runs through a sandy, flat, monotonous waste to la Skhirra. It continues to the crossing of the Oued er Rmel, along the edge of marshes, where the area is liable to flood. About 5 miles beyond the Oued er Rmel the road crosses the Oued el Akarit, set between high banks. It then skirts the Arad plain, crossing the Oued el Melah and running over the plain through the oasis of Bou Chemma to Gabès. Most of the oued crossings are by 'Irish bridges', which are liable to flooding after rains, particularly between el Djem and la Hencha and south of la Skhirra.

Other routes leaving Route 9: 9b, 9a, 8, 9c, 9d, 9e, 9f, 9g, 9h, 9i, 8b, 11 and 12.

9a. SOUSSE-MOUREDDINE, 7 miles (11 km.), runs south-west through olive-groves all the way.

9b. SOUSSE-SFAX, through Monastir and Mahdia, 109½ miles (176 km.), P. 16, C. 92, and P. 16, is a levelled road and is generally good. At first it runs through olive-groves and past the Sebkha Ain Sahline, crossing a branch of it, and passes on to the promontory of Monastir. From here it runs along the coast through olive-groves, orchards, and fishing-villages, turning slightly inland to Moknine. Thence it runs along a neck of land between the sea and the Sebkha Mta Moknine among large olive-groves to Mahdia. Just beyond the town it leaves the shore and runs through gardens irrigated by wells to Ksour Essaf. Thereafter it returns to the shore and runs to Chebba, beyond which plantations alternate with steppe for some distance; between Djebiniiana and Sfax there are large olive plantations.

9c. BOURDJINE-MOKNINE, through Djemmal, 20 miles (32 km.), C. 88, is a metalled road passing mostly through olive plantations.

9d. EL DJEM-LA SMALA DES SOUASSI, 9½ miles (15 km.), C. 87, is a metalled road. From la Smala des Souassi there is a track south-west to Chourbane (20½ miles, 33 km.) and Bou Thadi (33½ miles, 54 km.).

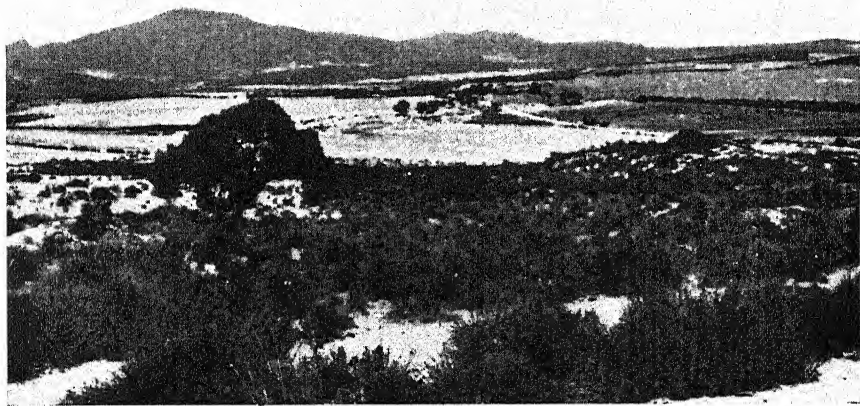
9e. EL DJEM-KSOUR ESSAF, 18½ miles (30 km.), C. 96, is a metalled road through open country near el Djem and olive-groves near Ksour Essaf.

9f. LA HENCHA-SFAX, through Bir Tebeuk, 39 miles (63 km.), C. 97 and C. 18, runs through olive-groves all the way.

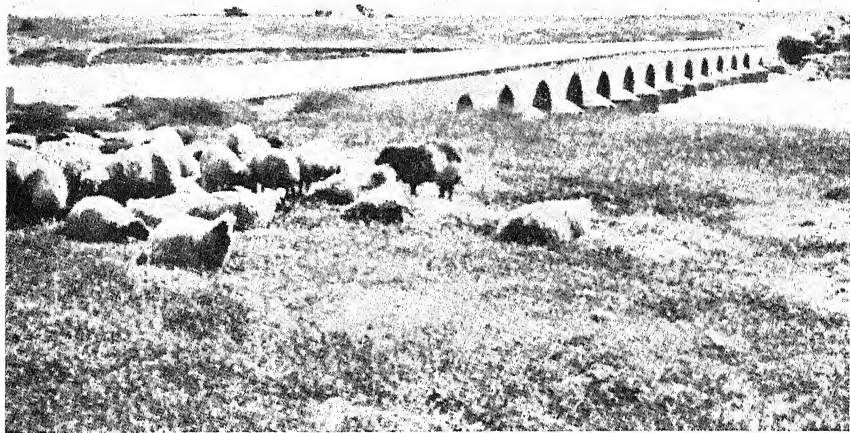
9g. LA HENCHA-DJEBINIANA, 11 miles (18 km.), C. 97, is a metalled road running through olive-groves.



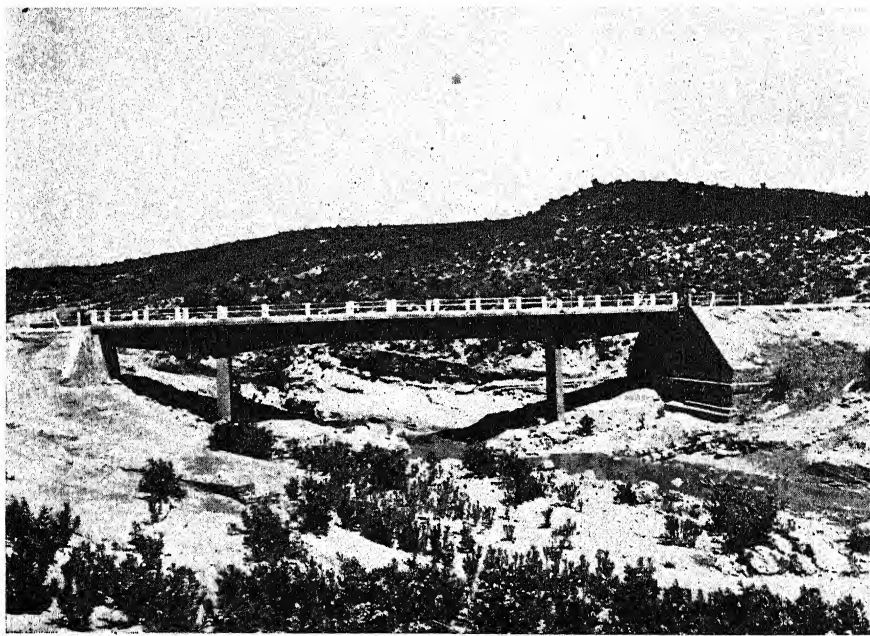
207. Country immediately north of the reservoir on the Oued el Kebir (Route 7 b)



208. Country immediately south of the reservoir on the Oued el Kebir (Route 7 b)



209. Country west of Route 7: restored Roman bridge over the Oued Nebana on track north from Kairouan



210. Bridge over the Oued Maarouf on the Ain Mestour-Pont du Fahs track

9h. SFAX-MAHARÈS through Agareb, $32\frac{1}{2}$ miles (52 km.), C. 22, runs through olive-groves all the way.

9i. ACHICHINA-GAFSA, $85\frac{1}{2}$ miles (138 km.), C. 6, is a track which runs westward over arid steppe. It crosses the track from Kairouan to la Skhirra (Route 8b), and passes a cistern at $10\frac{1}{2}$ miles (17 km.). It enters the gum forest of Bled Talha at 25 miles (41 km.) and later crosses the southern slopes of Djebel bou Hedma, to emerge from the forest at 45 miles (72 km.), where there is another cistern. Thence it runs between Djebel Chemsî on the south and Djebel bou Smail on the north, to join the track from Gabès to Gafsa (Route 11) near el Guettar, from which the track continues to Gafsa.

ROUTES RADIATING FROM SFAX

10. SFAX-TÉBESSA, via Lessouda, Sbeitla, Kasserine. 172 miles (277 km.). P. 20.

For nearly 40 miles the road runs through continuous olive plantations, and then, as they become rarer, traverses an open plain, crossing the track from Kairouan to la Skhirra (Route 8b). Skirting the northern slopes of Djebel Krechem (2,150 ft.) it crosses the vast plateau of Bled el Hania (650 ft.) to wells and watering ponds at $59\frac{1}{2}$ miles (96 km.). Here the road follows a pass between Djebel Sidi Kralif on the north and Djebel bou Dzer on the south, and continues over a plain to Lessouda, at the foot of a hill of the same name. The road runs through open country, crossing the railway outside Sbeitla. Thence road and rail run to the crossing of the Oued el Hatab, and on to Kasserine, where the road turns up the valley of that river, following it between Djebel Semmama on the north-east and Djebel Chambi on the south-west into the broad Foussana plain, over which it passes. It then crosses the Oued el Hatab and soon enters a defile between Djebel bou Ghanem (3,550 ft.) on the north and Djebel el Hamra (3,650 ft.) on the south. The Oued el Hatab is crossed again, and the road follows the river over a small plain to the defile of Khanguet el Mouhad, on the Algerian frontier. It descends steeply into the plain of the Merdja to Tébessa. The road is metalled to Lessouda, beyond which its condition is uncertain: there are several bad stream crossings, sometimes impassable in wet weather, between Sbeitla and Kasserine.

Other routes leaving Route 10: 9, 8b, 10a, 10b, 8c, 3b, 8c, 10c.

10a. LESSOUDA-AGAREB, $74\frac{1}{2}$ miles (120 km.), is a track running south-south-west to Sidi bou Zid (5 miles, 8 km.) and thence east-south-east, more or less parallel to Route 10, to Agareb and Sfax.

10b. LESSOUDA-GAFSA, 67 miles (108 km.), P. 3, is a made-up track running through Sidi bou Zid and Bir el Hafey (22 miles, 35 km.) at the foot of a ravine-ridden massif. Thence it crosses a monotonous open plain to Henchir el Fesdeguia, follows a valley for a time to Madjene el Fedj, and crosses several oueds to Gafsa.

10c. KASSERINE-THALA, $32\frac{1}{2}$ miles (52 km.), P. 20 and P. 23, is a motorable track. For 3 miles (5 km.) it follows Route 10, and then branches and crosses the Oued el Hatab. Leaving Djebel Semmama on the east, it runs north-north-west to Thala, from which there is a connexion with Route 3c at Kalaa Djerda.

Note: Other routes radiating from Sfax are included with those radiating from Sousse and Gabès which run towards Sfax.

ROUTES RADIATING FROM GABÈS

II. GABÈS-TÉBESSA, via Gafsa, Fériana. 177 $\frac{1}{2}$ miles (286 km.). P. 1, C. 102, and P. 23^{et}; N. 10 in Algeria.

This is a good main road with large traffic capacity. For 6 miles (10 km.) out of Gabès it follows Route 9: it then branches left to Metouia, an oasis of 20,000 palm-trees, and continues to Oudref, where there are wells, two of them artesian. Thence it crosses a oued and follows the northern shore of the Sebket el Hamma, to turn north-west and pass between hills. It leaves Bordj Fedjedj, situated in damp scrub, on the east and runs over varied hill-and-plateau country through the oasis of el Guettar to Gafsa, from which tracks radiate. The road continues north-west, following the right bank of the Oued el Kbir, and crosses to the left bank before leaving the oued to approach Bordj Maajen bel Abbès, where it joins the railway from Sbeitla to Tozeur. The road then turns north, following the railway across the plateau with many ravines, crosses a oued, and follows the Bou Haya valley to Fériana. There is an alternative route between Gafsa and Fériana through Ksour Sidi Aich, from which a road goes to Kasserine. Thence it strikes north-west up the Bou Haya valley, crossing the railway and branching left at Oglet bou Haya and ascending to Dernaia, where it enters wooded country. It rises steeply over a pass and descends to Bou Chebka on the Algerian frontier: thence it runs across a wooded plateau and open country to pass through a defile, and continues through open rolling country to Tébessa.

Other routes leaving Route II: 9, 11a, 11b, 11c, 9i and 11b, 10b, 11d, 12, 11e, 8c.

11a. OUDREF-EL HAMMA, about 23 $\frac{1}{2}$ miles (38 km.), is a track,

probably impassable in wet weather, leaving Route 11 about 14 miles (22 km.) west of Oudref and running south: it crosses the eastern end of the Sebkret el Hamma to el Hamma.

11*b*. BIR ZELLOUJA-EL GUETTAR, about $37\frac{1}{2}$ miles (60 km.), is a track running north to el Hafay, a fortified post, and through a pass between Djebel Chemsî (2,590 ft.) on the west and Djebel ben Kreir (1,925 ft.) on the east. It then runs north-west to join the track from Achichina to Gafsa (Route 92), and continues to el Guettar.

11*c*. EL GUETTAR-KEBILI, about $54\frac{1}{2}$ miles (88 km.), is a track, probably impassable in wet weather, which branches off Route 11 about 14 miles (23 km.) east of el Guettar. It crosses the eastern heights of the mountain chain stretching east of Tozeur, and then crosses the Chott el Fedjadj before passing through a small oasis to Kebili.

11*d*. GAFSA-TAMERZA, about 50 miles (80 km.), is a track across open country, negotiating the Oued el Melah and the Oued Seldja: it crosses the railway at two points.

11*e*. GAFSA-LE MDILLA, about $12\frac{1}{2}$ miles (20 km.), is a track following the railway line south to the phosphate mines of le Mdilla.

12. GABÈS-NEFTA, via Gafsa, Philippe-Thomas (Metlaoui), Tozeur. 167 miles (269 km.).

The route from Gabès through el Guettar to Gafsa is described under Route 11. The road skirts the oasis of Gafsa to the north and leaves the road to Fériana and Tébéssa (Route 11) on the right. It enters a sandy stretch and approaches the railway, which it follows and crosses to negotiate the Oued el Melah, following it again through country devoid of vegetation to Philippe-Thomas (Metlaoui lies about 1 mile (1.8 km.) to the north-west). The road turns south and descends the Oued Seldja, and crosses the railway in two places and the Oued el Melah once more. Road and rail then run through open country: tracks leave the road for Gafsa, and for Kriz and the oasis of el Oudiane. The road continues to el Hamma du Djerid, where a track branches right to Tamerza, and past Tozeur station to Tozeur. Here there is a junction with the track from Gabès to Nefta (the Triq el Oudiana) over the Chott Djerid (Route 14). From Tozeur there are two roads, one skirting the north-western side of the chott and running over bare dunes to Nefta, and the other, a dry-weather road, passing in places over the Chott Djerid.

Other routes leaving Route 12: 11, 12a, 14, and the tracks mentioned above.

12a. TOZEUR-TAMERZA, 46 miles (74 km.), is a track. It follows Route 12 to el Hamma du Djerid and then strikes north-west: it crosses the Oued el Melah and the north-eastern corner of the Chott el Rharsa, and continues across open country to Chebika, an oasis of 7,000 palm-trees at the foot of Djebel Bliji. From here the track passes through wild gorges to Tamerza.

13. GABÈS-BEN GARDANE, via Mareth and Médenine. 95 miles (153 km.). P. 1 and P. 27 (Photo. 211).

The road runs through desert country almost throughout, with oases and areas of cultivation: it is well constructed, with tarred and stone surfaces, primarily as a military road. Leaving Gabès the road climbs gently over the Arad plain, passing between small oases to Mareth, near an oasis which extends along the Oued Mareth (Photo. 211). A track on the right leads to Beni Zelten and Toujane and another on the left to Zarat and Gourine. The road continues over the Arad plain through the small oasis of Arram, crosses the Oued ez Zeuss and Henchir Ksar Koutine and then rises over a spur of Djebel Tadjera on to a stony plateau. It leaves Metameur half a mile to the west and reaches Médenine, where it turns east-north-east and undulates through cultivated ground and orchards as far as the branch to Zarzis (Route 13c). Thence the road turns south-east and runs over the flat and bare Djeffara plain between the mountains and the sea. It passes wells in the bed of the Oued bou Ahmed and reaches Oglet Nefatia, where there are wells. Here a track strikes south-west to Foum Tatahouine through Kasba Drina. There are wells at Bir el Ouahmia and a little beyond them the road enters the plantations of Ben Gardane, from which numerous tracks radiate, including that following the boundary between Tunisia and Libya to Dehibat, Djeneien, and Fort Saint.

Other routes leaving Route 13: 13a, 13b, 13d, 13c, and the tracks mentioned above.

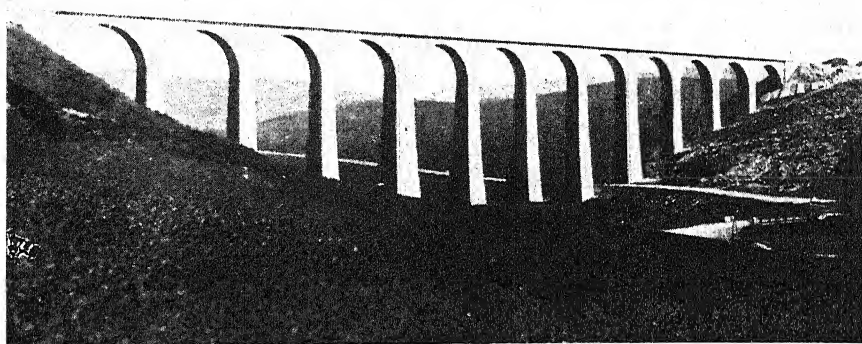
13a. GABÈS-TOUJANE, through Matmata, $42\frac{1}{2}$ miles (68 km.), C. 107, is a stone road which passes into a track. There are steep gradients and sharp corners before Matmata. The road passes small oases and wells in the plain, and then the track climbs sinuously up the rugged valley of the Oued Djir, continuing to Matmata. Beyond Matmata the track rises through broken country, passing a cistern, to the crest which dominates the whole of the Djeffara plain as far as the sea, and continues to Toujane.



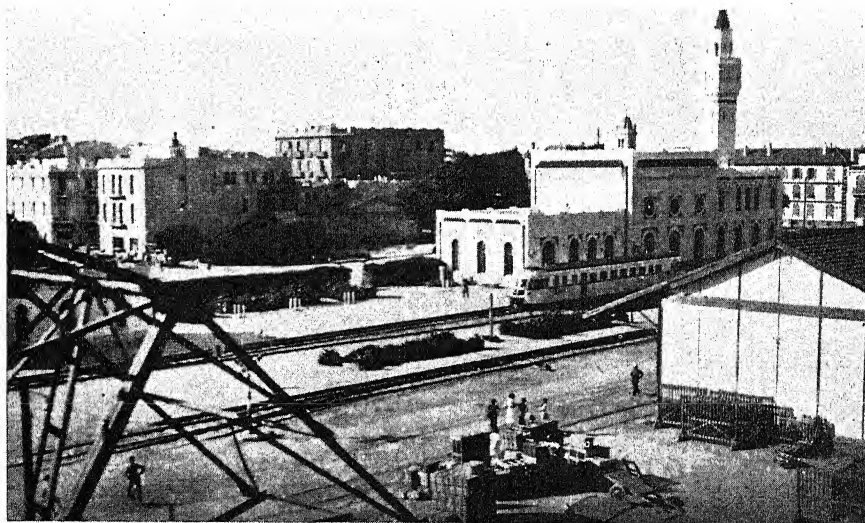
211. *Road between Gabès and Mareth (Route 13)*



212. *Track between Foum Tatahouine and Bordj le Bœuf*



213. *Viaduct over road and the Oued Béja (Route 4)*



214. *Bizerta station*

13*b*. MÉDENINE-DJOLF (for the Île de Djerba), 30 miles (48 km.), C. 108, is a good road which branches left off Route 13 about half a mile north of Médenine. It runs north-east across open country to Bou Grara, and thence along the western shore of the Golfe de bou Grara to Djolf from which there is a ferry to Adjim on the Île de Djerba.

13*c*. MÉDENINE-ZARZIS, 39 miles (63 km.), P. 27 and P. 26^e, is an excellent French military road. It follows Route 13 for 10 miles (16 km.), and then leaves the road to Ben Gardane, forking left and continuing along the northern shore of the Sebkret el Melah to enter the gardens of Zarzis. From Zarzis there is a rough motorable track south along the coast to Ben Gardane, and a road running north-west through Sidi Chemmakh to el Kantara Continent, from which there is a ferry to el Kantara on the Île de Djerba.

13*d*. MÉDENINE-FOUM TATAHOUINE, 31 miles (50 km.), P. 1, is a good road which crosses many oueds. It runs south throughout, at first through flat country shaded by trees. It passes Bir el Ahmar (wells) and Sidi Mosbah, where the country is more broken. Thence it rises gently, crossing a oued and ascending the valley of the Oued Tatahouine, dominated on the west by Djebel Tlalett, to Foug Tatahouine.

From Foug Tatahouine a motorable track leads south to Dehibat, subsequently deteriorating and crossing the Libyan boundary to Nalout; a track goes east-north-east to Ben Gardane and another west-north-west to Matmata, and a motorable track runs south to Bordj le Bœuf, and from there to Djeneien (112 miles, 180 km.) and Fort Saint (239 miles, 385 km.) (Photo. 212). Many oueds have to be crossed, and there are some difficult sandy patches and dunes.

14. GABÈS-NEFTA, via el Hamma, Kebili, Kriz, Tozeur. 150½ miles (242 km.). P. 1 and P. 24.

This is an open desert track, metalled to el Hamma and over a short stretch immediately before Kebili. It leaves the route to Sfax (Route 9) about 1½ miles out of Gabès and strikes west over the undulating Arad plain, skirting the foot of Djebel ed Dissa (500 ft.), and running through cultivated land (cereals, palms, and olives) to the oasis of el Hamma. The road continues over bare, open, stony country with patches of scrub and with drinking water only at certain water-points. It skirts the northern slopes of Djebel Tebaga (1,300 ft.), crossing water-courses which descend from these hills. The Chott el Fedjadj, which is dry in summer, lies to the north. Farther

on the road climbs the north-western slopes of Djebel Tebaga and negotiates a pass commanding a view of Kebili and the Chott Djerid: from here it descends and crosses a oued to enter Kebili. An alternative track from el Hamma to Kebili follows the southern side of Djebel Tebaga.

The road continues along the promontory of land which juts west towards the Chott Djerid, through an almost continuous succession of oases with good wells. Telmine is one of the most notable of these oases, with an artesian well giving 900 gallons per minute: from here a track leads north-east to the important oasis and springs of Mannsoura. Passing through Telmine the road continues through the belt of oases, which it leaves to cross a sandy stretch to the Chott Djerid. It crosses the chott itself by the track known as the Trik el Oudiania, which is marked by poles and stones, and is practicable throughout the year, but for motor vehicles only from the beginning of March. There are soft patches, and it may be dangerous to stray from the trail because the chott fills with water to a depth of 3 feet in wet seasons, and may not be dry until June. After crossing the chott the road mounts on to sandy ground to reach the Kriz oasis, where the road joins the railway from Gafsa. It follows the railway, descending through a series of oases, of which el Oudiane is the chief, in which grow palms, olives, oranges, and lemons. The road crosses several rivulets which descend from the hills on the north before reaching the oasis of Tozeur, where is the junction with the road from Gafsa to Nefta (Route 12). From Tozeur there are two roads to Nefta (Route 12). Nefta is a military post and an important oasis of 300,000 palms, and also olives, figs, apricots, and peaches: there is abundant water. A track leads west-south-west to el Oued in the Souf oases (Route 14e).

Other routes leaving Route 14: 9 and 11, 14a, 11c, 14b, 14c, 14d, 12, 14e.

14a. EL HAMMA-MATMATA, 28½ miles (46 km.), is a track following the Oued el Hamma through open country for two-thirds of the way: it then climbs into hills to reach Matmata.

14b. KEBILI-MATMATA, 62 miles (100 km.), is a track, not always practicable, which runs east on the southern side of Djebel Tebaga, through Tamezred. At Matmata the track joins Route 13a which it follows to Toujane, and is continued through Metameur to Médenine.

14c. KEBILI-DOUZ, 17½ miles (28 km.), is a track, stated to be motorable, which runs south across the eastern extension of the Chott Djerid (the Chott Kebili) through Djemna (artesian well) to Douz

(two artesian wells, palm-groves). Thence there is a track to Bordj le Bœuf, through Ksar Rhilane: most of it is poor with heavy sand especially near Ksar Rhilane, south of which many oueds have to be negotiated.

14*d*. KEBILI-SABRIA, $26\frac{1}{2}$ miles (43 km.), is a track of unknown quality running south-west across the Chott Kebili.

14*e*. NEFTA-EL OUED (SOUF OASES), $74\frac{1}{2}$ miles (120 km.), is a track stated to be motorable, though difficult and sandy. For about 53 miles (85 km.) it runs west-south-west across monotonous desert with wells at intervals. Most of these are salt, but there is good drinking water at Bir el Asli, Bir el Hamri on the Algerian boundary, and Chouchet el Yhoudi. The track then runs south-west and south through a series of oases interspersed among high dunes.

OTHER DESERT ROUTES

It will be observed that many tracks in southern Tunisia, other than those mentioned above, are shown on various maps, as for example the track from Foum Tatahouine through Bir Soltane to Route 14*b* near Bir Rhezene. These have been noted in the general remarks on the road network (p. 368) and, with few exceptions, no information concerning them is available for publication. It is likely that those which are clear of the heavy sand in the western part of southernmost Tunisia (Fig. 12) are motorable, provided due care and skill are used both in equipment and driving. Those passing near or through heavy sand may be difficult for motor vehicles. Probably all of them are, or have been, camel-routes. It is considered that no useful purpose is served by verbal definition or description of these routes.

CHAPTER XVI

RAILWAYS

TUNISIA is well served with railways and before the outbreak of the present war had a total length of over 1,300 miles. There are two systems, the normal gauge (4 ft. 8½ in., 1·435 m.) and the narrow or metre gauge (3 ft. 3⅝ in., 1 m.), meeting only at Tunis.

History

Railway development at first used Tunis as the centre, but with the discovery of rich deposits of phosphate and mineral ores in different parts of the country, the subsidiary ports gained importance and a system of intercommunication, with the ports as outlets, was established.

The creation of the system falls into four distinct periods:

- (i) 1871-1880. The Bey's Government did not discourage construction but was financially incapable of establishing a railway system. Only the Tunis-la Goulette-la Marsa line was completed in these years. In 1876 a concession was granted for a line from Tunis to Souk el Arba.
- (ii) 1880-1903. This period coincides with the establishment of French control over Tunisia. In 1882 the Bey transferred to the French Government the privilege of granting railway concessions in the Protectorate. This was modified in 1892 by a formula which allowed the Bey to grant concessions without authority from the French Government, provided neither a loan nor a guarantee of interest was involved. Concessions involving financial guarantees were submitted for approval to the French Government. The Tunisian authorities, seeking to preserve their autonomy, therefore favoured combinations which they could authorize, and in 1896 granted a concession for a railway from Sfax to the phosphate deposits of Gafsa.
- (iii) 1902-1910. In 1902, by arrangement with the French Government, the French authorities, for all practical purposes, became responsible for all new construction. In 1903 a programme of works was presented to the French Government and in 1907 authorization was obtained for a loan of 75 million francs for new construction of railways and other works.

- (iv) Since 1910. In 1910 Tunisia acquired entire autonomy in the construction of railways under the reserve imposed by the regime of the Protectorate, and all subsequent extensions have been made under this authority.

Railways of the Bône-Guelma Company. This company had entered into close relations with the Tunisian Government prior to the establishment of the Protectorate. By a *firman* the Bey in 1876 conceded to the Société des Batignolles, for a period of fifty years, a line from Tunis to the lead mines of Djebba. The concession was handed over to the Société des Chemins de fer de la Medjerda, and the Tunisian Government agreed not to grant to another company any concession for a railway within 50 km. (31 miles) of this line, nor to allow any other body to extend the railway to the frontier. This extension was granted in 1878 to the Bône-Guelma Company (Compagnie de Bône à Guelma), to which body the Société de la Medjerda had added its rights. The lines from Tunis to the Algerian frontier were completed in 1886; that from Tunis to Hammam Lif was opened in 1882, but has since been changed to narrow gauge.

As the concession from the Tunisian Government was not accompanied by any financial guarantees, the Bône-Guelma Company entered into a supplementary agreement with the Government of Algeria by which it was guaranteed a minimum net revenue of 10,122 francs per km. up to a distance not exceeding 220 km. (137 miles). By a subsequent agreement the Tunisian Government conceded to the company the construction of a line from Djedeida to Bizerta and from Tunis to Sousse.

At the same time the Bône-Guelma Company attempted to secure control of the line from Tunis to la Goulette and la Marsa. The concession for this line had been granted in 1871 to an English company, but in 1880 it was acquired by an Italian company under a guarantee of 4.4 million francs from the Italian Government, and the control remained under Italian patronage. Further, the stipulation in the original concession that the Tunis-la Goulette-la Marsa Company was to have a monopoly of railway communication between these points prevented the Bône-Guelma Company from extending its line to la Goulette, then the port of Tunis.

The construction of the lines of the Bône-Guelma Company was based essentially on commercial development, and many of them would never have been built had it not been for the location of mineral deposits. Strategic needs played no primary part in the company's policy, but no doubt influenced the French

Government in providing guarantees for the line from Algeria to Tunis.

The Bône-Guelma Company lines are now operated by the Compagnie fermière des Chemins de fer Tunisiens.

Sfax-Gafsa-Tozeur Railway. In 1896 the Tunisian authorities granted a concession for a railway from Sfax to the phosphate deposits of Gafsa in return for a concession to the Société Française d'Études et d'Entreprises to exploit phosphate to the south-west of Gafsa and to the north of Tamerza as far as the Algerian frontier, together with 74,000 acres (30,000 hectares) of land in the Sfax district. It was stipulated that the railway should be built from Sfax to the Oued Seldja, and that, after the expiration of twenty years, it might be repurchased by the Tunisian Government. The concession became the property of the Compagnie des Phosphates et du Chemin de fer de Gafsa (Compagnie Gafsa), which constructed the railway in 1898-1899. The line was opened as far as Metlaoui-Philippe-Thomas in 1899, and was subsequently extended to Tabeditt and Redeyef (1909), Henchir Souatir (1910), and Tozeur (1916). The railway southward to Gabès, constructed by the Tunisian Government in 1915-1916, is operated by the Compagnie Gafsa. The primary reason for the building of the Sfax-Gafsa line was commercial: the line from Graiba to Gabès is of strategic value.

Routes

The following account describes the routes and gives such other information as is likely to be useful in view of the changes brought about by the progress of the war, both as regards modification and war-damage. It is considered that in the present circumstances little can usefully be said on terminal facilities, signalling and safety regulations, locomotives and rolling-stock, and traffic and capacity.

The principal routes are as follows:

- Route 1. TUNIS-GHARDIMAOU (thence to Souk Ahras in Algeria and the Algerian normal-gauge system).
- „ 2. DJEDEIDA (on Route 1)-BIZERTA.
- „ 3. MATEUR (on Route 2)-TABARKA.
- „ 4. MATEUR (on Route 2)-NEBEUR.
- „ 5. TUNIS-TÉBESSA (connecting with the Algerian narrow-gauge system).
- „ 6. TUNIS-SFAX.
- „ 7. SOUSSE-HENCHIR SOUATIR.
- „ 8. SFAX-METLAOUI.

Route 9. METLAOUI (on Route 8)–HENCHIR SOUATIR (on Route 7).

„ 10. GRAIBA (on Route 8)–GABÈS.

„ 11. METLAOUI (on Route 8 and 9)–TOZEUR.

„ 12. HAIDRA (on Route 3)–KASSERINE (on Route 7).

Fig. 71 shows these lines with the principal branches.

The ownership, operation, and the length of the systems in 1939 was as follows:

- (i) Routes 1–4: normal gauge, all single track; owned by the Government and operated by the *Compagnie fermière des Chemins de fer Tunisiens*, with headquarters in Paris. Total route length, 315.7 miles (508 km.); loops, sidings, &c., a further 32.3 miles (52 km.).
- (ii) Routes 5–7 and 12: narrow (metre) gauge, all single track except the double-track section between Tunis and Hammam Lif; owned and operated as the normal-gauge lines. Total route length, 764 miles (1,229 km.); loops, sidings, &c., a further 76.4 miles (123 km.), and double track, 10.6 miles (17 km.). Total length, 851 miles (1,369 km.).
- (iii) Routes 8–11: narrow (metre) gauge, all single track; operated by the *Compagnie des Phosphates et du Chemin de fer de Gafsa* (*Compagnie Gafsa*). Total route length, 290.2 miles (467 km.).

Routes 8 and 9 were built by, and belong entirely to, the *Compagnie Gafsa*; Route 10 was built by the Government and Route 11 by the *Compagnie Gafsa* for the Government, the receipts from both lines being shared. The *Compagnie Gafsa* also owns and operates the phosphate loading installations at Sousse and Sfax and has an agricultural estate with 200,000 olive-trees and a modern olive-oil plant at Chahal, 31 miles (50 km.) from Sfax on Route 8.

The reasons for the peculiar mixture of ownership and operation are, as already noted, to be found partly in the economic development of the country and partly in strategic needs. Thus Route 1 is strategically important as a trunk line connecting with the main Algerian and Moroccan systems. Of the narrow-gauge system, Routes 6 and 10 have strategic importance for moving troops rapidly from north to south, and Route 11 for the connexion it provides between the Algerian narrow-gauge system and the south of Tunisia through Routes 5, 12, 7, and 9. Connexion, without break of gauge, is also made thereby between the Algerian system and the coastal lines 10, 8, and 6.

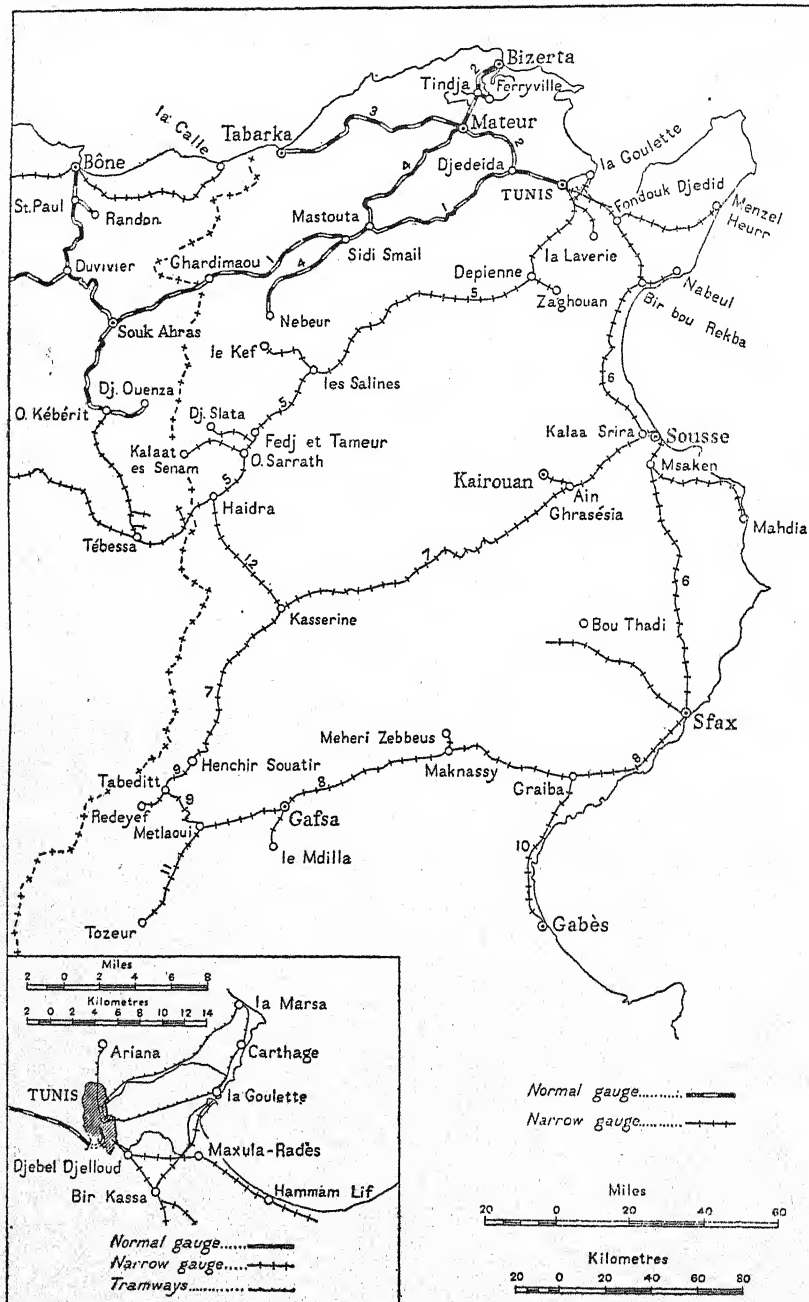


FIG. 71. The railways of Tunisia

The other lines have been built mainly for the export of phosphate and mineral ores. There is also considerable traffic in cereals and olives.

In addition to the above lines there are electric tramways from Tunis to Ariana (5 miles, 8 km.) and from Tunis to la Goulette, Carthage, and la Marsa, and back to Tunis along the northern side of the Lac de Tunis (24 miles, 38 km.): the Tunis-la Marsa lines carried an average of $7\frac{1}{2}$ to 9 million passengers and 5,000 to 12,000 tons of goods per annum in peace-time. No technical details are available for publication.

Permanent Way

The normal-gauge lines were constructed with flat-bottomed rails, 47.8 and 46.3 kg. per metre, in 12-m. lengths, and the Government narrow-gauge lines with flat-bottomed rails, 36.5 kg. per metre, in 9.6-m. lengths. The Compagnie Gafsa narrow-gauge rails were flat-bottomed, 25 kg. per metre, in 10-m. lengths, at least for the original construction in 1898.

Rail fastenings on all Government lines were: in steel sleepers, clips and bolts; in wooden sleepers, 4 coach screws (8 in joint sleepers). Clips and bolts were used on the Compagnie Gafsa lines.

On the normal-gauge lines 16–20 untreated oak or steel sleepers were used per rail length, and on the government narrow-gauge lines 13–16 steel sleepers per rail length. The Compagnie Gafsa used steel sleepers at 89.5-cm. spacing.

Traction

Steam was in general use before the outbreak of the present war: Diesel engines and railcars were used on a small scale. Electrification was limited to the tramways of Tunis. There were 54 locomotives of various types and 7 railcars on the normal-gauge system, and 182 locomotives (various) and 14 railcars on the Government narrow-gauge lines: the Compagnie Gafsa owned 93 locomotives and probably 2 railcars. The Government depots and repair shops were at Tunis: the Compagnie Gafsa had extensive and well-equipped shops at Sfax and engine sheds with a turntable at Gafsa.

Fuel is imported either from overseas or by rail from Kenadza in Algeria.

Water-supply is difficult on all lines. On Routes 8, 9, and 10 wells are sunk, and tunnels driven from them under the oueds; the water is pumped from them as far as 4 or 5 miles (7 or 8 km.): it is hard and has to be specially treated.

Rolling-stock

There was a total of 64 passenger coaches, 40 luggage vans, and 772 wagons of various types on the normal-gauge lines, and 187 coaches, 87 vans, and 2,368 wagons on the Government narrow-gauge system. The Compagnie Gafsa owned 48 coaches, 87 vans, and 1,788 wagons. The braking system is Westinghouse compressed air on the normal-gauge and Compagnie Gafsa lines; side buffers with central couplings are used: information on the braking system and couplings on the Government narrow-gauge rolling-stock is not available.

Traffic and Capacity

Under present circumstances little useful information can be given. In 1939 the double track between Tunis and Hammam Lif carried 25 trains and the Tunis-Bizerta line 5 railcars per week-day each way: no other lines in the country normally carried more than about 3 trains of any sort or railcars over any section. As a general rule lines had a minimum of 1 train or railcar per day each way.

On all routes passing loops are closely enough spaced to allow of considerably more trains per day in each direction than is necessary to meet the normal traffic demands.

New Works

A line was projected from Sfax to Sbeitla on the Sousse-Henchir Souatir line (Route 7) and is reported to be constructed from Sfax through Triaga and south of Bou Thadi to the intersection with the Kairouan-la Skhirra road near Djebel Krechem. No further information is available.

A 60-cm. (1 ft. 11 $\frac{3}{8}$ in.) Decauville track southward from Gabès towards the Mareth defences was dismantled in 1940. There was no construction between Médenine and the Libyan frontier.

DESCRIPTION OF ROUTES

1. TUNIS-GHARDIMAOU

Length, 117 miles (189 km.); normal gauge, single track throughout; maximum gradient 1 in 83; minimum radius of curves 300 metres.

GENERAL DESCRIPTION

Tunis is the terminus of the normal-gauge line which runs the whole length of French North Africa to the ports of the Atlantic

coast. From Tunis the line runs through agricultural country to Djedeida; here it reaches the valley of the Oued Medjerda, which it follows with few divergences to the Algerian frontier. The line crosses and recrosses the river by bridges, and is also carried over numerous tributaries: it climbs steeply between Medjez el Bab and Oued Zarga, between which summit level is reached. Throughout its length a main road (Route 3) runs near or beside it, and there are several crossings. The line traverses agricultural country most of the way to Ghardimaou, beyond which it climbs a rugged gorge to the uplands around Souk Ahras in eastern Algeria. Only in this last stretch does it attain and exceed the altitude reached between Medjez el Bab and Oued Zarga.

DETAILED DESCRIPTION

<i>Distance in km. from Tunis</i>	<i>Stations</i>	<i>Remarks</i>
0	TUNIS	Alt. 13 ft. (4 m.); <i>see</i> p. 249 and Figs. 45 and 48. Line passes under 2 road bridges and through a curved tunnel 350 m. long, with deep cuttings at either end.
6	LE BARDO	Junction for harbour branch. Line crosses flat agricultural country.
9	MANOUBA	Alt. 92 ft. (28 m.).
22.5	..	Bridge over Oued Chafrou.
23	..	Bridge over Oued Medjerda.
25	DJEDEIDA	Alt. 66 ft. (20 m.). Junction of lines to Tunis, Bizerta, and Ghardimaou, all interconnected by triangle about 1 km. west of station. Line continues fairly straight through more hilly country on northern side of the winding Medjerda.
34	TEBOURBA	Alt. 95 ft. (29 m.).
41	TAULIERVILLE	Alt. 118 ft. (36 m.). Halt. } Line crosses 9 small
51	BORDJ TOUM	Alt. 177 ft. (54 m.). } bridges over tribu-
57	EL HERI	Alt. 184 ft. (56 m.). } taries of Oued Me-
66	MEDJEZ EL BAB	Alt. 181 ft. (55 m.). Town 2 km. south-west of station: <i>see</i> p. 220. Line turns west away from river, crossing main Tunis-Béja road and climbing through brush-covered hills. Crosses about 12 small bridges before Oued Zarga.
78	..	Alt. 591 ft. (180 m.). Summit level of line. Line descends on gradient of 1 in 83.
85	OUED ZARGA	Alt. 322 ft. (98 m.). Line turns south and rejoins Oued Medjerda. Bridge over Oued Zarga and several small bridges or culverts.

<i>Distance in km. from Tunis</i>	<i>Stations</i>	<i>Remarks</i>
94	..	Alt. c. 295 ft. (90 m.). 5 bridges over Oued Medjerda at 94, 96, 100, 103.5 (Photo. 13), and 104 km., and also about 16 small bridges or culverts.
96	MZOURAH	Alt. c. 361 ft. (110 m.). Halt.
104.5	..	Tunnel.
105.5	..	Bridge over Oued Medjerda.
106.5	PONT DE TRAJAN	Alt. 361 ft. (110 m.). Line turns south-west.
108.5	..	Junction north-east of Mastouta (facing south-west) for Béja (13 km.) on Route 4.
109	..	Bridge over Oued Medjerda.
110	MASTOUTA	Alt. 361 ft. (110 m.). Line runs along south side of Oued Medjerda across plain. 2 short tunnels and 1 very short tunnel under hills 457 ft. (139 m.) high.
119	SIDI SMAÏL	Alt. 394 ft. (120 m.). Route 4 to Nebeur leaves on left.
120.5	..	Bridge over Oued Medjerda.
128	..	Bridge over Oued Kasseb. Thence line runs dead straight almost due west.
132	SOUK EL KHEMIS	Alt. 420 ft. (128 m.). Line bends slightly south and runs straight for 3 km.
135	..	2 bridges over Oued bou Heurtma. Line runs south-west and straight for 14 km., then turns south.
144	BEN BACHIR	..
151	..	Bridge over Oued Medjerda.
155	SOUK EL ARBA	Alt. 466 ft. (142 m.). Junction of several roads. See p. 225. Line crosses plain close south of winding Oued Medjerda.
167	SIDI MESKINE	Alt. 522 ft. (159 m.).
176.5	..	Alt. 584 ft. (178 m.). Bridge over Oued Meliz.
178	Oued MELIZ- CHEMTOU	Alt. 571 ft. (174 m.). Station for lead and zinc mines of Djebel et Touireuf south of line.
189	GHardimaou	Line runs along south side of Oued Medjerda. Alt. 656 ft. (200 m.).

2. DJEDEIDA-BIZERTA

Length, 45 miles (73 km.); normal gauge.

GENERAL DESCRIPTION

The Djedeida-Bizerta line runs through the agricultural plain of Mateur. It skirts the eastern side of the Garaet Achkel and the western shore of the Lac de Bizerte: a short branch serves Ferryville.

DETAILED DESCRIPTION

<i>Distance in km. from Djedeida</i>	<i>Stations</i>	<i>Remarks</i>
0	DJEDEIDA	Alt. 66 ft. (20 m.): <i>see</i> Route 1. Line runs north over open plain.
5	CHAOUAT	Alt. 56 ft. (17 m.).
13	SIDI ATHMAN	Alt. 56 ft. (17 m.). Line bends north-west and crosses west end of Garaet el Mabtouha marsh.
25	AIN RHELAL	Alt. 190 ft. (58 m.). Line turns west and descends.
29.5	..	Alt. 148 ft. (45 m.). Bridge over Oued ech Chair.
40	MATEUR	Alt. 49 ft. (15 m.). Junction with Routes 3 and 4. Station on east side of Oued Djoumine. Town lies west of station on hill: <i>see</i> p. 218. Line turns sharply north, crosses main road, and runs across level plain. 2 small bridges or culverts.
49	..	Alt. 20 ft. (6 m.). Bridge over road and small river. Line skirts east side of Garaet Achkel.
55	TINDJA	Alt. 53 ft. (16 m.). Junction for branch 4 km. east to Ferryville: <i>see</i> p. 208 and Figs. 43 and 44.
56.5	..	Bridge over Oued Tindja. Line continues north along west shore of Lac de Bizerte.
61	..	Alt. 3 ft. (1 m.). Bridge over Oued el Haima.
63	SIDI AHMED	Alt. 7 ft. (2 m.). Line follows north-west shore of Lac de Bizerte, with military airfield on left.
65.5	..	Small bridge over Oued Merazig.
68	KAROUBA	Alt. 33 ft. (10 m.). Halt.
69	LA PÊCHERIE	Alt. 49 ft. (15 m.).
73	BIZERTA	<i>See</i> p. 236 and Figs. 43 and 44 (Photo. 214).

3. MATEUR-TABARKA

Length, 64 miles (103 km.); normal gauge.

GENERAL DESCRIPTION

From Mateur the line enters a fertile valley and climbs steeply, passing through the wooded and brush-covered Mogods; there are several tunnels and the oueds are bridged. The summit tunnel lies near el Aouana, beyond which the line descends through Sedjenane to Nefza. It climbs again over the flanks of the Kroumirie before descending to the port of Tabarka. The main road from Tunis and Mateur to Tabarka and Bône runs close to the line for most of the way.

DETAILED DESCRIPTION

<i>Distance in km. from Mateur</i>	<i>Stations</i>	<i>Remarks</i>
0	MATEUR	Alt. 49 ft. (15 m.): <i>see</i> p. 218. Junction with Route 2 facing north towards Bizerta. Line skirts south end of town to junction (facing west) with Route 4. Two adjacent bridges over branches of Oued Djoumine.
4	MATEUR SUD	Alt. 56 ft. (17 m.). Line follows south edge of fertile plain.
9	MICHAUD	Alt. c. 98 ft. (30 m.). Line turns west, climbing through brush-covered hills: crosses Oued Rezala.
17	DJALTA	Alt. c. 328 ft. (100 m.). Line turns south-west and climbs along south side of valley of Oued el Gouss. Short tunnel.
27	JEFNA	Alt. c. 771 ft. (235 m.). 2 short tunnels and several small bridges or culverts.
37	EL AOUBANA	Station for lead mines at Bazina; embankments.
38.5	..	Tunnel. Line climbs to summit tunnel under wooded heights of the Mogods and then descends. 3 small bridges or culverts. Line turns north and runs along west bank of Oued Magrat, then west through brush-covered hills.
51	SEDJENANE	Alt. c. 492 ft. (150 m.). Station serving tobacco-producing area of the Mogods. Line follows south edge of marshy depression of Garaet Sedjenane with mines at Sidi Driss (iron, zinc, lead) and Douaria (iron).
52.5	..	Tunnel 419 m. long under north spur of Djebel bel Harch. Line turns sharply south down valley of Oued el Glia into fertile plain.
64	TAMERA	Alt. 394 ft. (120 m.) (Photo. 216). Iron mines.
67.5	..	Long bridge over road and Oued el Glia (Photo. 215).
72.5	..	Bridge over Oued Zouara.
73	NEFZA	Alt. c. 66 ft. (20 m.). Iron mines: originally terminus of line.
77	..	Bridge over Oued Malah.
80	OUCHTATA	Alt. c. 82 ft. (25 m.). Halt. Agricultural centre.
85	..	Bridge over main road and Oued Ahmar.
89	AIN SEBAA	Alt. c. 263 ft. (80 m.). Halt. Bridge over main road. Village between forest-clad mountains on south and sand-dunes with some vegetation on north.
93	RAS RADJEL	Alt. c. 197 ft. (60 m.).
95.5	..	Bridge over Oued bou Terfess. Line descends towards coast.
102	..	Bridge over Oued el Kebir.
103	TABARKA	<i>See</i> p. 233 and Fig. 42.

4. MATEUR-NEBEUR

Length, 89 miles (143 km.); normal gauge.

GENERAL DESCRIPTION

The line carries passenger traffic from Mateur to Sidi Smail, beyond which it is a mineral line only. The line climbs the valley of the Oued Djoumine and then winds along the hillsides to Béja: there are two important viaducts and some small bridges, and the line reaches an altitude of about 853 feet, before descending to 715 feet at Béja. The line follows the Oued Béja to the Oued Medjerda, which it crosses, and then follows the southern side. It traverses the Merja plain and turns up the valley of the Oued Mellègue, reaching an altitude of over 1,000 feet at the iron mines of Nebeur.

DETAILED DESCRIPTION

<i>Distance in km. from Mateur</i>	<i>Stations</i>	<i>Remarks</i>
0	MATEUR	Alt. 49 ft. (15 m.): see p. 218 and Routes 2 and 3. Line turns south.
4	MATEUR SUD	Alt. 56 ft. (17 m.). Line climbs along west side of valley of Oued Djoumine.
11	EL ARIMA	Alt. c. 131 ft. (40 m.). Line turns south-west.
21	..	Alt. c. 328 ft. (100 m.). Viaduct of 9 arches over Oued Djoumine. About 10 small bridges or culverts over tributaries of Oued Djoumine between 21 km. and 34 km.
25	METTARHENI	Alt. c. 361 ft. (110 m.). Line turns south and winds along hill-side.
34	SIDI NSIR	..
42	ZRIBA	Halt.
51	KSAR MEZOUAR	Alt. c. 853 ft. (260 m.).
58	SIDI MHIMECH	..
63	..	Alt. 623 ft. (190 m.). Viaduct of 12 arches over road and Oued Béja (Photo. 213).
68	BÉJA	Alt. 715 ft. (218 m.): see p. 205. Line bends east, then south along west side of valley of Oued Béja.
79.5	..	Junction with Route 1.
80	..	Bridge over Oued Medjerda.
81	MASTOUTA	Alt. 361 ft. (110 m.). Line runs along south side of Oued Medjerda across plain. 2 short tunnels and 1 very short tunnel under hills 457 ft. (139 m.) high.
90	SIDI SMAIL	Alt. 394 ft. (120 m.). From here line leaves Route 1 and continues south-west as mineral line with no passenger traffic.

<i>Distance in km. from Mateur</i>	<i>Stations</i>	<i>Remarks</i>
98	MANGOUC	Alt. c. 492 ft. (150 m.).
103	LE KOUDIAT	Halt: Line runs across Merja plain.
104	..	Long bridge over Oued Massila.
107	MERJA KHEREDDINE	..
112	..	Long bridge over Oued Tessa.
118	DAKHLA (DAKLA)	..
123	..	Long bridge over Oued Mellègue, about 7 km. south-east of Souk el Arba (on Route 1). Line follows west bank of Oued Mellègue.
129	MUTHUL	..
130	..	Bridge over Souk el Arba-le Kef road. Line climbs through brush-covered hills.
136	..	Bridge over Oued Mellègue.
137	..	Tunnel about 0.75 km. long.
143	NEBEUR	Alt. c. 1,017 ft. (310 m.). Large iron mines.

5. TUNIS-TÉBESSA

Length, 185 miles (297 km.); narrow gauge.

GENERAL DESCRIPTION

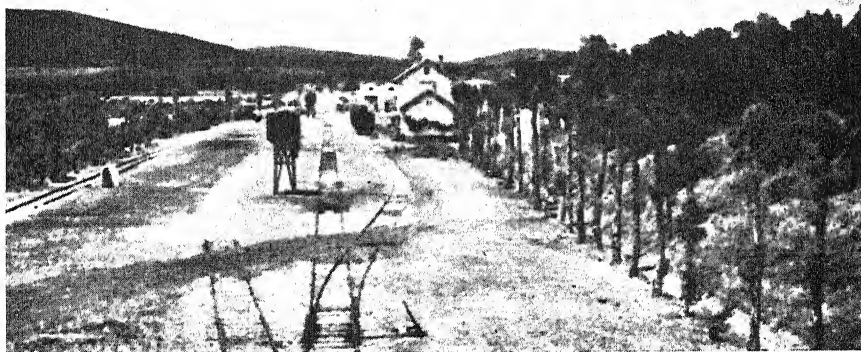
This line rises from sea-level at Tunis to about 3,000 feet between the Algerian frontier and Tébéssa. From Tunis it passes south to the valley of the Oued Miliane, which it ascends; it goes through Depienne (with a branch to Zaghouan), and then across the plains of Pont du Fahs and Bou Arada and the basin of the Oued Siliana. The line climbs into the High Tell, passing le Krib and les Salines and continuing across rugged uplands all the way to Tébéssa. It is essentially a mineral line, though passengers are carried: there are several branches to iron and phosphate mines. There are many bridges and culverts. Altitudes beyond Pont du Fahs are only approximate, and between Haidra and Rhilane do not agree with estimates given in the volume on Algeria (*Geographical Handbook*, B.R. 505 A, pp. 419-420).

DETAILED DESCRIPTION

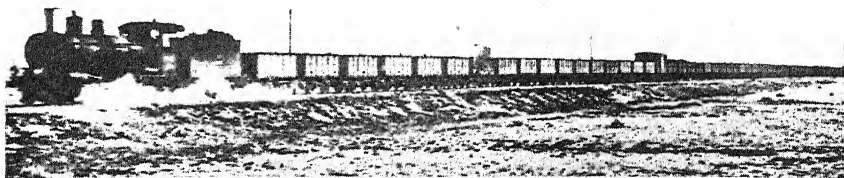
<i>Distance in km. from Tunis</i>	<i>Stations</i>	<i>Remarks</i>
0	TUNIS	Alt. 13 ft. (4 m.): see p. 249 and Figs. 45 and 48. Line runs south-east along edge of harbour.
4	DJEBEL DJELLOUD	Junction (facing north-west) for Route 6.
5	LES ATELIERS	Halt.
7	BEN AROUS	Alt. 20 ft. (6 m.). Halt.



215. Bridge over road and the Oued el Gha, south of Tamera (Route 3)



216. Tamera station



217. *Phosphate train (Route 8)*



218. *Sfax station*

<i>Distance in km. from Tunis</i>	<i>Stations</i>	<i>Remarks</i>
9	BIR KASSA	Junction (facing north-west) for branch 20 km. south-east to la Laverie through la Cebala du Mornag and Crétéville, and (facing south-east) for branch to Maxula-Radès and la Goulette. Line bends south.
13	NASSEN	Alt. 69 ft. (21 m.). Line turns south-west.
19	..	Alt. 112 ft. (34 m.). Bridge over Oued Miliane.
20	KHLÉDIA	Alt. 118 ft. (36 m.).
24	..	Small bridge.
25	OUDNA	Alt. 184 ft. (56 m.).
26.5	..	Bridge over aqueduct. Line runs straight south-west through open country following Roman aqueduct from Zaghouan to Carthage.
28	BOU ER REBIA	Alt. 187 ft. (57 m.). Halt. 4 small culverts.
36	CHEYLUS	Alt. 285 ft. (87 m.). Village east of station.
38.5	..	Bridge over aqueduct. 3 small bridges or culverts; line bends south.
47.5	..	Bridge over aqueduct.
48	..	Small bridge or culvert.
49	DEPIENNE (SMINDJA)	Alt. 453 ft. (138 m.). Junction (facing north) for branch 13 km. east to Zaghouan through Moghrane. Village east of station. Line bears south-west, winding and climbing through low hills, with some cultivation.
55	EL AOUJA	Alt. 512 ft. (156 m.). Halt. 3 small bridges or culverts.
64	PONT DU FAHS	Alt. 574 ft. (175 m.).
66	..	Bridge over Oued el Kebir. Line turns west and crosses plain of Pont du Fahs.
73	THIBICA	Alt. c. 623 ft. (190 m.).
81	TARF ECH CHENA	Alt. c. 689 ft. (210 m.).
90	BOU ARADA	..
96	DJELIDA	Small bridge or culvert. Alt. c. 722 ft. (220 m.). Line becomes winding. 2 small bridges.
106	EL AROUSSA	Village south of station.
107	..	Line crosses Oued Siliana and bends south-west, becoming very winding as it climbs through brush-covered hills on west side of Oued Siliana.
113	SIDI AYED	..
121	GAFOUR	Village west of station.
132	EL AKHOUAT	Alt. c. 1,116 ft. (340 m.). Line turns west. 2 small bridges.
139	LE KRIB	Alt. c. 1,411 ft. (430 m.). Northward loop extending both sides of station. Village 9 km. north-west. Line bends south. 3 small bridges or culverts.
150	SIDI BOU ROUIS	Alt. c. 1,312 ft. (400 m.).

<i>Distance in km. from Tunis</i>	<i>Stations</i>	<i>Remarks</i>
152	..	Line crosses Oued Tessa and follows west bank with woodland on the west.
157	TRIKA	Alt. <i>c.</i> 1,476 ft. (450 m.). Line crosses and recrosses Oued Tessa, and runs through gorge with Djebel Maiza on right.
166	LE SERS	Alt. <i>c.</i> 1,575 ft. (480 m.). Line crosses plain of le Sers from east to west.
172	LES SALINES	Alt. <i>c.</i> 1,640 ft. (500 m.). Junction (facing east) for branch 31 km. north to le Kef (phosphate, lead, and zinc mines; <i>see</i> p. 215), through Lorbeuss and Zagrane.
176	OUED TESSA	Alt. <i>c.</i> 1,805 ft. (550 m.). Halt. Line bends south-west and runs through defile between Djebel Lorbeuss and Djebel bou Nader. Crosses to east side of Oued Tessa.
180	LES ZOUARINES	Alt. <i>c.</i> 1,870 ft. (570 m.). Line enters a plain and runs south-west.
191	EBBA KSOUR	Alt. 2,034 ft. (620 m.). Line again becomes winding.
201	AIN MESRIA	Alt. <i>c.</i> 2,264 ft. (690 m.).
207	FEDJ ET TAMEUR	Alt. <i>c.</i> 2,542 ft. (775 m.). Line descends, winding sharply.
212	..	Junction (facing north) for branch 29 km. west to Djebels Djerissa and Slatra (iron mines).
216	GOURAIA	Alt. <i>c.</i> 2,198 ft. (670 m.).
223	OUED SARRATH	Alt. <i>c.</i> 1,970 ft. (600 m.). Junction (facing north-east) for branch 30 km. west to Kalaat es Senam (phosphate mines). Branch runs for 1 km. parallel to main line, then turns at right angles and runs straight, crossing Oued Sarrath and one smaller river to Majouba (12 km.): thence winds through Bir Lafou (el Afou) and Rebiba to Kalaat es Senam, from which there are extensions to Bou Jaber mines (9 km.), and to Ain ed Diba mine (4 km.).
228	..	Line crosses 3 tributaries of Oued Sarrath.
236	KALAA DJERDA	Bridge over Oued Sarrath. Alt. <i>c.</i> 2,198 ft. (670 m.). Mineral sidings.
254	HAIDRA	Line climbs along west bank of Oued Sarrath. Alt. <i>c.</i> 2,706 ft. (825 m.). Junction for branch south-east to Kasserine (Route 12).
260	..	Small bridge.
261	AIN KERMA	Alt. <i>c.</i> 2,870 ft. (875 m.). Algerian frontier.
262	..	Small bridge. Line bends south.
272	RHILANE	Alt. <i>c.</i> 3,034 ft. (925 m.). Mineral branch about 3 km. north to Djebel Kouif.
297	TÉBESSA	Alt. 2,805 ft. (855 m.). Junction (facing east) with line north to port of Bône.

6. TUNIS-SFAX

Length, 173 miles (279 km.); narrow gauge; double track, Tunis-Hammam Lif.

GENERAL DESCRIPTION

The double-track section to Hammam Lif skirts the coast: thence the single line continues along the coast and then turns away to cross the base of the Cap Bon peninsula, which is served by a branch line to Soliman and Menzel Heurr. The line, with the main road, runs across the Lower Tell, through rich vineyards and occasional olive-groves as far as Bir bou Rekba. Thence the line skirts the bare low coast and marshes of the Golfe de Hammamet, with occasional vineyards and olive-groves, to Enfidaville: Hammamet is served by a branch line. From Enfidaville rail and road run over open steppe, passing into the low hills and olive plantations of the Sahel of Sousse. Thence through el Djem road and rail traverse open, pastoral, and agricultural country, with large plantations of olives near and around Sfax: Mahdia is served by a branch line. There are many bridges and culverts, and some level-crossings: the line runs over low-lying and fairly flat country throughout.

DETAILED DESCRIPTION

<i>Distance in km. from Tunis</i>	<i>Stations</i>	<i>Remarks</i>
0	TUNIS	Alt. 13 ft. (4 m.): <i>see</i> p. 249 and Figs. 45 and 48.
4	DJEBEL DJELLOUD	Junction (facing north-west) with Route 5. Line runs east.
6	MÉGRINE	Halt.
10	MAXULA-RADES	Line bends south-east and runs along shore of Golfe de Tunis.
14	ST. GERMAIN'	..
17	HAMMAM LIF	Double track ends.
24	BORDJ CÉDRIA- POTINVILLE	Alt. 59 ft. (17 m.). Line leaves sea and strikes south-east across base of Cap Bon peninsula.
29	FONDOUK DJEDID	Alt. 66 ft. (20 m.). Junction for branch to Menzel Heurr (58 km.) in Cap Bon peninsula. Branch runs north-east to Soliman, then east to Sidi Said (Menzel bou Zelfa, <i>see</i> p. 221): thence winds over wooded hills towards the coast, and runs north- east straight to Menzel Heurr, except for sharp turn at end. Only considerable crossing is over Oued Chiba. Main line continues south-east.
35	KHANGUET	Alt. 164 ft. (50 m.).
39	GROMBALIA	Alt. 164 ft. (50 m.): <i>see</i> p. 210. Line rises, crossing a watershed.
44	BELLI	Alt. 207 ft. (63 m.). Halt.

<i>Distance in km. from Tunis</i>	<i>Stations</i>	<i>Remarks</i>
48	BOU ARKOU	Alt. 230 ft. (70 m.). Line runs between low brushwood-covered hills and descends towards coast.
59	..	Bridge over main road.
60	BIR BOU REKBA	Alt. 66 ft. (20 m.).
61	..	Junction (facing north) for branch via Hammamet (4 km.) to Nabeul (17 km.), on north coast of Golfe de Hammamet: <i>see</i> p. 223. Main line bears south-west and crosses 2 small watercourses: occasional culverts.
68	..	Line turns south parallel to coast.
79	BOU FICHA	Alt. 39 ft. (12 m.). Line continues parallel to coast, separated from it by extensive salt lagoons.
87	AIN HALLOUF	Alt. 53 ft. (16 m.). Halt.
95	..	Bridge over main road.
100	ENFIDAVILLE	Alt. 69 ft. (21 m.). Line crosses several small watercourses by bridges or culverts.
113	MENZELDARBEL OUAR	Alt. 56 ft. (17 m.).
123	SIDI BOU ALI	Alt. 66 ft. (20 m.). Line becomes winding.
137	KALAA KEBIRA	Alt. 66 ft. (20 m.): <i>see</i> p. 214.
142	KALAA SRIRA	Alt. <i>c.</i> 131 ft. (40 m.). Junction (facing east) with Route 7, which diverges south-west. Turns sharply east and winds, then turns south through northern outskirts of Sousse.
149	SOUSSE	Alt. 30 ft. (9 m.): <i>see</i> p. 255 and Fig. 49. 1 or 2 small bridges: line crosses cultivated country.
163	MSAKEN	<i>See</i> p. 222. Junction (facing north) for branch via Moknine to Teboulba (on coast about 38 km. east) and Mahdia (about 18 km. farther south- east): <i>see</i> p. 262 and Fig. 51.
174	BOURDJINE	Bridge over Djemmal-Bourdjine road.
185	SIDI BOU GOUBRINE	Alt. <i>c.</i> 328 ft. (100 m.). Line continues over monotonous and fairly level plain.
192	KERKER	..
198	LE ROUADI	Halt.
215	EL DJEM	Alt. 361 ft. (110 m.): <i>see</i> p. 206.
228	..	Alt. <i>c.</i> 164 ft. (50 m.). Small bridge. Low bridge 1,300 m. long over west end of Sebkh el Djem. Ground inundated in winter.
233	LA HENCHA	.. Line continues through olive-groves, ascending gradually.
250	STE. JULIETTE	Alt. <i>c.</i> 328 ft. (100 m.). Continuous cultivation.
264	SIDI SALAH	Halt.
271	SAKIET EZ ZIT	Halt.
279	SFAX	Alt. 7 ft. (2 m.): <i>see</i> p. 266 and Figs. 52 and 53 (Photo. 218).

7. SOUSSE-HENCHIR SOUATIR

Length, 183 miles (295 km.); narrow gauge.

GENERAL DESCRIPTION

This is a mineral line, carrying passengers as required: it also serves Kairouan by a branch. It passes through Sbeitla, Kasserine, and Fériana. After leaving the olive plantations of the Sahel of Sousse it runs over the bleak, open plains of the Low Steppes, with more fertile country south of the Oued Zeroud. Thence it climbs steadily and passes through hilly country around Sidi Saad to enter the High Steppes: in the transitional stretch there is one long tunnel, a long bridge over the Oued el Hadjel, other engineering works, and considerable curvature. The High Steppes are bare or scrubby plains among high and rugged hills: oueds are crossed by several bridges. The summit level of the line is a few miles short of Fériana at about 2,645 feet. Road and rail run close to one another between Sbeitla and Fériana.

DETAILED DESCRIPTION

<i>Distance in km. from Sousse</i>	<i>Stations</i>	<i>Remarks</i>
0	SOUSSE	See p. 255 and Fig. 49.
7	KALAA SRIIRA	Alt. c. 131 ft. (40 m.). Junction (facing east) with Route 6. Line ascends valley of Oued Laya through olive plantations.
16	OUED LAYA	Halt. Line enters barren country.
28	KROUSSIAH SAHALI	Alt. c. 328 ft. (100 m.). Line becomes winding.
37	SIDI EL HANI	Alt. 269 ft. (82 m.). Passes Sebkhah de Sidi el Hani on left.
49	AIN GHRAŚÉSIA	Alt. c. 263 ft. (80 m.). Junction (facing south-east) for branch 12 km. north-west to Kairouan (see p. 211 and Fig. 40). Line crosses barren plain.
60	SIDI AMOR EL KENANI	Alt. c. 230 ft. (70 m.). Line continues south-west through more fertile country on south side of Oued Zeroud.
72	BIR BEN ZINA	Alt. 374 ft. (114 m.). Halt. Line climbs steadily.
89	PAVILLIER	Alt. c. 492 ft. (150 m.).
93	..	Line turns north.
95	..	Line turns west and runs by defile through Djebel es Siouf, then turns south and follows south bank of Oued Zeroud.
102	SIDI SAAD	Alt. c. 771 ft. (235 m.).

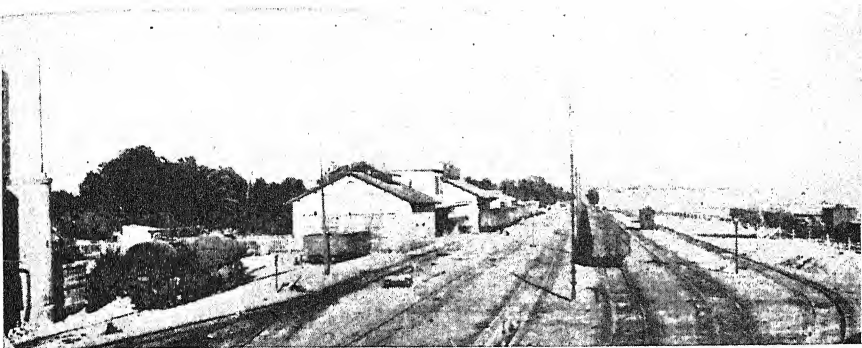
<i>Distance in km. from Sousse</i>	<i>Stations</i>	<i>Remarks</i>
107	..	Tunnel 461 m. long. Other engineering works and considerable curvature. Winding defile through Kef er Rakrmate. Rich zinc region.
117	..	Bridge 300 m. long and 20 m. high over Oued el Hadjel.
125	HADJEB EL AIOUN	Alt. c. 1,116 ft. (340 m.).
135	..	Alt. 1,300 ft. (396 m.).
143	DJILMA	Alt. 1,161 ft. (354 ft.). Undulating plain.
154	OUED ZERZOUR	Alt. c. 1,310 ft. (400 m.). Halt. Some cultivation.
171	SBEITLA	Alt. 1,722 ft. Line becomes winding.
187	HENCHIR GARAET EL ATÈCHE	Alt. 2,133 ft. (651 m.). Halt.
196	..	Bridge 60 m. long over Oued el Hatab.
202	KASSERINE	Alt. 2,214 ft. (675 m.). Junction for branch north-west to Haidra (Route 12). Line turns south-west.
221	MEGDOUDECHE	Alt. c. 2,608 ft. (795 m.). Halt.
..	..	Alt. c. 2,645 ft. (806 m.). Summit level of line.
235	THÉLEPTE	Alt. 2,608 ft. (795 m.). Bridge 200 m. long.
240	FÉRIANA	Alt. c. 2,428 ft. (740 m.).
246	..	Bridge over Oued el Hogueff.
265	BORDJ MAAJEN BEL ABBES	Alt. 2,067 ft. (630 m.).
269-274	..	Bridges (total length 370 m.) over arms of Oued el Kbir.
275	SIDI BOU BAKER	Alt. 1,919 ft. (585 m.). Halt. On south bank of Oued el Kbir.
295	HENCHIR SOUATIR	Alt. 1,638 ft. (499 m.). Connexion with Route 9.

8. SFAX-METLAOUI

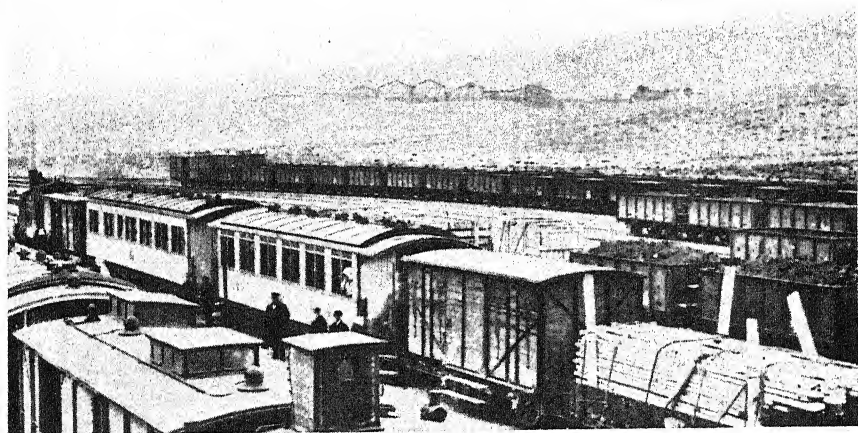
Length, 151 miles (243 km.); narrow gauge.

GENERAL DESCRIPTION

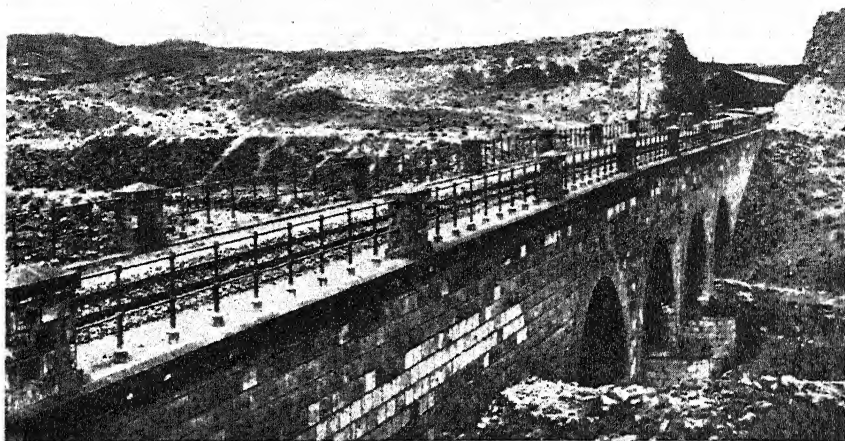
This is a mineral line, carrying passengers as required (Photo. 217). From Sfax it passes through olive plantations to Maharès (on the coast), Chahal, and Graiba (the junction for the line to Gabès), and then continues over open steppes, climbing steadily. The High Steppes are entered between Mezzouna and Maknassy; gradients increase near the former. The line then runs over barren, open country to Gafsa, serving phosphate mines there; other mines are served by a branch from Maknassy to Meheri Zebbeus. The summit



219. *Gafsa station*



220. *Metlaoui station, sidings*



221. *Viaduct south of Henchir Souatir (Route 9)*



222. *Tunnel, the Oued Seldja gorge (Route 9)*

level of the line (1,391 ft.) is near Sened, between Maknassy and Gafsa. From Gafsa there is a difficult stretch to Metlaoui with many bridges and engineering works. The aridity of the country causes great difficulties in many parts of the line.

DETAILED DESCRIPTION

<i>Distance in km. from Sfax</i>	<i>Stations</i>	<i>Remarks</i>
0	SFAX	Alt. 7 ft. (2 m.): <i>see</i> p. 266 and Figs. 52 and 53 (Photo. 218). Watering station. Junction with projected and partly constructed line to Sbeitla (cf. p. 394). Line leaves Quai des Phosphates and Quai du Commerce and follows road south-west, parallel to coast.
12	THYNA	Alt. 39 ft. (12 m.).
28	CHAFFAR	Alt. 53 ft. (16 m.).
35	MAHARÈS	Alt. 33 ft. (10 m.). Line turns west.
50	CHAHAL	Alt. 118 ft. (36 m.). Agricultural estate belonging to Compagnie Gafsa of about 74,000 acres with 200,000 olive-trees and modern olive-oil plant. 4 bridges or culverts.
62	GRAIBA	Alt. 138 ft. (42 m.). Junction (facing east) with Route 10. 8 small bridges or culverts. Line climbs steadily.
82	OGLET EL FOUNI	Alt. 269 ft. (82 m.). Crosses 6 other watercourses.
98	MEZZOUNA	Alt. 475 ft. (145 m.). Line bends north-west.
109	..	Alt. 649 ft. (198 m.). Sharp bend south-west. Increasing upward gradients and reverse curves through a pass between Djebel Naemia and Djebel bou Douaou.
117	..	Alt. 820 ft. (250 m.). Line emerges into open country.
118	GOURGUIBA	..
123	MAKNASSY	Alt. 843 ft. (257 m.). Junction (facing east) for branch 9 km. north to Meheri Zebbeus (phosphate mines).
129	..	Bridge over Oued bou Sellam.
140	..	Alt. 1,047 ft. (319 m.).
155	..	Alt. 1,378 ft. (420 m.).
157	SENEDE	Alt. 1,378 ft. (420 m.). Village on mountain side 9 km. south of station.
c. 161	..	Alt. 1,391 ft. (424 m.). Summit level of line.
168	..	Alt. 1,371 ft. (418 m.).
178	ZANNOUCH	Alt. 1,221 ft. (372 m.). Watering station. 2 bridges. Line runs along foot of Djebel Orbata.
192	..	Bridge in middle of Z-shaped curve.
196	..	Alt. 1,090 ft. (332 m.).
203	..	Hairpin loop southward between hills.

<i>Distance in km. from Sfax</i>	<i>Stations</i>	<i>Remarks</i>
204	GAFSA (GAFSA-GARE)	Alt. 895 ft. (273 m.). Station with ample sidings lies south of suburb of el Ksar (Photo. 219). Gafsa itself is 3 km. north-west on far side of Oued Baiech: <i>see</i> p. 208. Junction (facing east) for mineral branch running 9 km. south straight across plain and then climbing 4 km. to sidings at le Mdilla, with 5 km. extension to village (phosphate mine).
206	..	Long bridge over Oued Baiech. Line bends south for 1 km. along bank of Oued Baiech, then west across open plain, descending gradually.
213	..	Alt. 725 ft. (221 m.).
221	..	Alt. 594 ft. (181 m.).
229	..	Alt. 541 ft. (165 m.). Bridge over Oued el Melah. Line crosses about 14 small watercourses, and ascends gradually.
243	METLAOUI- PHILIPPE-THOMAS	Alt. 663 ft. (202 m.). Metlaoui is north and Philippe-Thomas south of station (Photo. 220). Junction (facing east) with Routes 9 and 11. Ample sidings. Phosphate mine.

9. METLAOUI-HENCHIR SOUATIR

Length, 29 miles (47 km.); narrow gauge.

GENERAL DESCRIPTION

The line joins Routes 7 and 8 with a branch to Redeyef (phosphate mines). It runs through difficult country and extensive engineering works, especially tunnels, bridges, curves, and gradients, were involved in its construction.

DETAILED DESCRIPTION

<i>Distance in km. from Metlaoui</i>	<i>Stations</i>	<i>Remarks</i>
0	METLAOUI- PHILIPPE-THOMAS	Alt. 663 ft. (202 m.): <i>see</i> Route 8 (Photo. 220). Line runs round west side of Metlaoui, then bends west, climbing steeply. Crosses 11 culverts.
8	MAGROUN	Alt. 778 ft. (237 m.). Line bends sharply north-east, then north, climbing steeply through Oued Seldja gorge. Tunnel.
9	..	Tunnel (Oued Seldja gorge) (Photo. 222).
10	..	Passes good water-supply point at el Hammam (pumping station for Metlaoui). 2 bridges between 10.1 km. and 12.5 km.

<i>Distance in km. from Metlaoui</i>	<i>Stations</i>	<i>Remarks</i>
		Bridge at 13.6 km., tunnel at 13.7 km., bridge at 14 km., tunnels at 14.1 km. and 14.9 km., and bridge, tunnel, and bridge at 15.1 km.
		Line bends north-west and passes pumping station for Redeyef (water slightly magnesian).
18	..	Bridge.
23.1	..	Bridge.
27	TABEDITT	Alt. 1,325 ft. (404 m.). Junction (facing south-east) for branch 15 km. south-west to Redeyef (this line is sinuous and crosses 5 bridges).
		Main line turns sharply north.
27.5	..	2 bridges close together over Oued Tabeditt.
		Sharp hairpin bend up valley of Oued Tabeditt: line winds north-west away from river.
36	MOULARÈS (AIN MOULARÈS)	Alt. c. 1,394 ft. (425 m.).
	..	3 small bridges.
44	..	Tunnel (short).
46	..	Viaduct (Photo. 221).
47	HENCHIR SOUATIR	Alt. 1,638 ft. (499 m.). Connexion with Route 7.

10. GRAIBA-GABÈS

Length, 50 miles (81 km.); narrow gauge.

GENERAL DESCRIPTION

With Routes 6 and 8 this is a strategic line, though it also serves the port of Gabès, and, by road connexions, the date-growing oases and the Monts des Ksour. It runs over generally flat country crossed by oueds, some of them considerable obstacles (for example, the Oued el Akarit): there are, therefore, several bridges. The Sfax-Gabès road runs beside the line for most of the way, through desolate country in which there are small areas of palm-groves and cultivation.

DETAILED DESCRIPTION

<i>Distance in km. from Graiba</i>	<i>Stations</i>	<i>Remarks</i>
0	GRAIBA	Alt. 135 ft. (41 m.): <i>see</i> Route 8.
11	..	Bridge over Oued Cheritet el Kelbo (Photo. 223).
26	LA SKHIRRA (CEKHIRA)	Alt. 92 ft. (28 m.). Gypsum quarry.
36	..	Alt. 10 ft. (3 m.). Bridge over Oued bou Said. Sebket el Guettiate on east.
41	..	Alt. 49 ft. (15 m.). Bridge over Oued er Rmel. Sebket Dreiaa on east.

<i>Distance in km. from Graiba</i>	<i>Stations</i>	<i>Remarks</i>
50	..	Alt. 56 ft. (17 m.). Bridge over Oued el Akarit (Photo. 224).
62.5	..	Alt. 39 ft. (12 m.). Bridge over Oued el Melah.
64	AOUINET	Alt. 56 ft. (17 m.). Relatively good underground water-supply (several wells 200-300 ft. (60-90 m.) deep); groves of olives and palms. Line crosses road and strikes south-east towards the coast.
72	RHENNOUCH	Alt. c. 49 ft. (15 m.). Small oasis. At Bou Chemma (3 km. south) are several artesian wells, irrigating a cultivated area of 62 acres.
79	GABÈS PORT	Bridge over Oued Gabès (Photo. 225): <i>see</i> p. 272 and Fig. 54.
81	GABÈS MENZEL	..

11. METLAOUI-TOZEUR

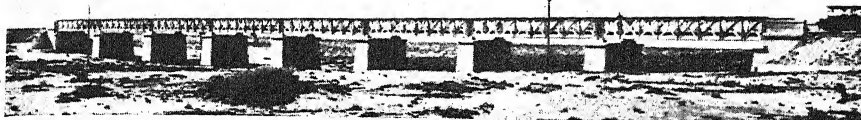
Length, 34 miles (54 km.); narrow gauge.

GENERAL DESCRIPTION

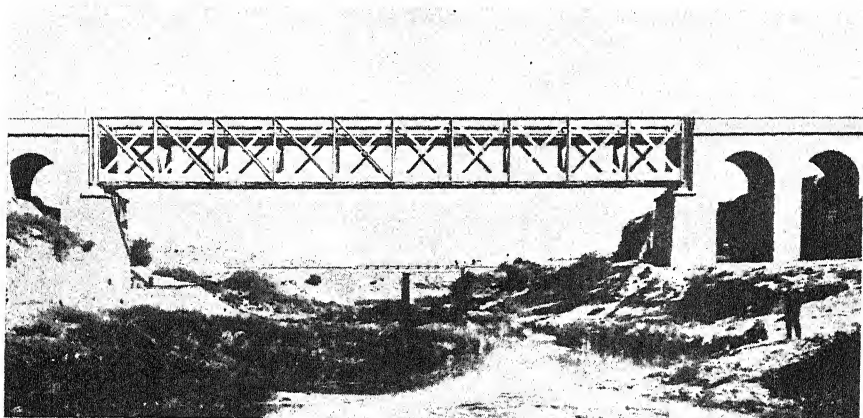
The line leaves Route 8 and runs over sterile steppe to the crossing of the Oued Gouifla (the upper reaches of the Oued el Melah): about 12 miles farther on the line enters groups of villages and palms and descends rapidly to the oasis of Tozeur. Blown sand has to be cleared from some sections of the line (Photo. 226). The line serves the oases on the northern side of the Chott Djerid and has strategic importance in that it connects this part of southern Tunisia with the Algerian narrow-gauge system through Routes 9, 7, 12, and 5 to Tébessa.

DETAILED DESCRIPTION

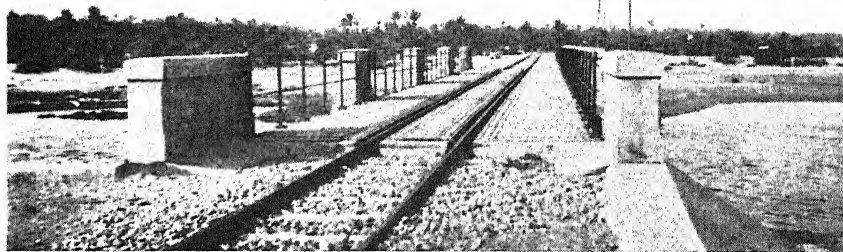
<i>Distance in km. from Metlaoui</i>	<i>Stations</i>	<i>Remarks</i>
0	METLAOUI- PHILIPPE-THOMAS	Alt. 663 ft. (202 m.): <i>see</i> Route 8 (Photo. 220). Line bends sharply south and descends.
12	..	Alt. c. 337 ft. (103 m.). Line runs straight south-west over sterile steppe to Oued Gouifla (upper reaches of Oued el Melah).
22	..	Alt. 138 ft. (42 m.). Bridge over Oued Gouifla. Line again ascends with some bends.
39	KRIZ	Alt. c. 328 ft. (100 m.).
44	EL OUDIANE- DEGACHE	Alt. c. 246 ft. (75 m.). Groups of villages among palms on a rocky escarpment.
54	TOZEUR	Alt. c. 164 ft. (50 m.): <i>see</i> p. 228. Oasis bordering Chott Djerid, into which drains the water from about 200 springs yielding 165 gallons of water per second.



223. *Bridge over the Oued Cheritet el Kelbo (Route 10)*



224. *Bridge over the Oued el Akarit (Route 10)*



225. *Bridge over the Oued Gabès (Route 10)*



226. *Clearing line between Metlaoui and Tozeur (Route 11)*

12. HAIDRA-KASSERINE

Length, *c.* 50 miles (80 km.); narrow gauge.

GENERAL DESCRIPTION

The line, which is open to general traffic, joins Haidra (on Route 5) to Kasserine (Route 7). It crosses the eastern end of the Monts de Tébéssa to the valley of the Oued el Hatab, which it follows across the Foussana plain, passing between Djebels Chambi and Semmama to Kasserine. There are seventy-two engineering works including a bridge, 40 metres (131 ft.) long, over a river near Haidra (south-east of Haidra station), another bridge over the Haidra-Kasserine road and then a tunnel, and a third bridge near Kasserine.

DETAILED DESCRIPTION

No information available.

CHAPTER XVII

OTHER COMMUNICATIONS

WATERWAYS

TUNISIA has few perennial waterways apart from the Oued Medjerda and its tributaries and the other rivers of the north, and none of these is navigable. In the past the Medjerda was navigable to Utique, but it now ends in an extensive marshy delta (pp. 32-33). The lack of navigable waterways considerably delayed the country's economic development until railways and motor roads were constructed.

SEA ROUTES

In peace-time Tunisia was connected by numerous shipping services with both the Mediterranean and Atlantic ports of France. Most of the passenger and cargo traffic went from Tunisian ports to Marseilles, though there were also regular services to other ports in France, and to Italy, the United Kingdom, and elsewhere. Marseilles is 422 sea miles (485 miles) from Bizerta (normally 26 hours' journey) and 471 sea miles (542 miles) from Tunis (28-31 hours).

The main sea routes were operated before the outbreak of war by the following companies:

Tunis-Marseilles

Compagnie générale Transatlantique (twice weekly, one direct run and one calling at Bizerta).

Compagnie de Navigation mixte (weekly, direct).

Daher et Compagnie (about three times monthly, calling at Bizerta, St. Louis du Rhône, and Port de Bouc).

Compagnie nouvelle navale Busck (every twelve days, calling at Cette and St. Louis du Rhône).

Tunis-Rouen

Compagnie navale de l'Ouest (every ten days, calling at Algerian ports, Brest, St. Malo, and Boulogne).

Affrêteurs Français (several times monthly, calling at Brest).

Delmas (weekly).

Tunis-Le Havre

Compagnie Havraise péninsulaire de Navigation à vapeur (calling at Algerian ports).

Tunis-Dunkirk

Compagnie des Bateaux à vapeur du Nord (every twenty days, calling at Algerian ports).

Tunis-Nice

Société maritime nationale (twice monthly, calling at Malta and Corsica).

Tunis-Algiers

Société Algérienne de Navigation (irregular, mainly cargo service).

Tunis-Genoa

Société de Navigation 'Tirrenia' (weekly, calling at Cagliari and Leghorn).

Tunis-Naples

Société de Navigation 'Tirrenia' (weekly, calling at Trapani and Palermo).

Tunis-Antwerp

Lloyd Royal Belge (twice weekly, calling at Algerian ports and Rouen).
Armement Deppe (every ten days).

Tunis-Hull

Ellerman's Wilson Line, Ltd. (about every ten days).

Tunis-Liverpool

Cunard White Star, Ltd. (twice monthly).

Tunis-Manchester

Prince Line, Ltd. (twice monthly).

Tunis-Tripoli

Farrudia et Compagnie (weekly, calling at Malta).

Bizerta-Marseilles

Compagnie générale Transatlantique (weekly, part of Tunis-Marseilles service).

In addition there were local Tunisian services linking the mainland with the various islands such as the Île de Djerba and the Îles Kerkenna, and between the various ports. The Compagnie maritime Tunisienne ran a service from Tunis to Zarzis every ten days, calling at Sousse, Sfax, Gabès, and the Île de Djerba.

AIR

The following notes are based on the position before the outbreak of the present war, and no reference is made to developments since that event or since the campaign in Tunisia in 1942-1943. General information on the suitability of terrain for airfields and on climate

can be obtained from Chapters II and IV: neither detailed appreciation nor deductions concerning the operation of air services is included owing to conditions imposed by the war.

In 1939 the main airfields in Tunisia were at el Aouina (5 miles north-east of Tunis), a combined civil and military airfield, and at Sidi Ahmed (Bizerta), Kairouan, and Gabès, which were mainly military stations. There were also many smaller airfields and landing-grounds throughout Tunisia, nearly all the principal towns being so equipped. Tunis also had a seaplane port (Aéroport) at Khéredine on the Lac de Tunis.

The country was served by both French and Italian commercial air services. The main French company operating was Air France, with a daily service both ways (except Monday) between Tunis, Ajaccio (Corsica), and Marseilles (631 miles) with connexions to Paris. In 1938 over 383,000 miles were flown on commercial service between Marseilles and Tunis and 5,827 passengers, 24.3 tons of freight (excluding baggage), and 22.5 tons of mail were carried.

Régie Air Afrique took over in 1936 the Tunis-Algiers-Oran service, which connected at Oran with the Air France Toulouse-South America service. There was a daily service from Tunis to Algiers with stops at Constantine and Bône.

During 1938, 2,353 aircraft arrived and left the Tunis (el Aouina) airfield with 11,745 passengers: 11.7 tons of mail and 19.6 tons of freight (excluding baggage carried free) and excess baggage arrived, and 11.3 tons of mail and 7.5 tons of freight and baggage were dispatched.

SIGNAL COMMUNICATIONS

The following notes summarize the position in 1939-1940: references to developments since that date are omitted.

Telegraph and Telephones

The telegraph and telephone system is State-operated. There are 184 telegraph offices, some of which are very small with only one key and sounder set. The principal lines are overhead and are shown on the map in the pocket at the end of the book. In 1936 there were 12,318 telephones in use, including 5,000 automatic, 4,000 magneto, and 2,500 central battery types. Most of the automatic lines were in Tunis where the main exchange had 2,000 lines, the Belvédère exchange 1,000 lines, and the Bellevue exchange 100 lines. There were small automatic exchanges in Sfax, Sousse, and Bizerta.

Submarine Cables

The following submarine cables were operated in 1939:

Bizerta-Marseilles (three).

Nabeul-Beirut (Syria).

Nabeul-Jgalo (Topla bay, near Kotor, Yugoslavia).

The cables landing at Nabeul were continued by land lines to Tunis and Sousse. Cables are shown on the map in the pocket at the end of the book.

Wireless Stations

The main wireless stations of Tunisia in 1939-1940 were as follows:

Military stations: Bir Kecira (Bordj le Bœuf), Fort Saint, Gabès, Kebili, Médenine, and Tunis.

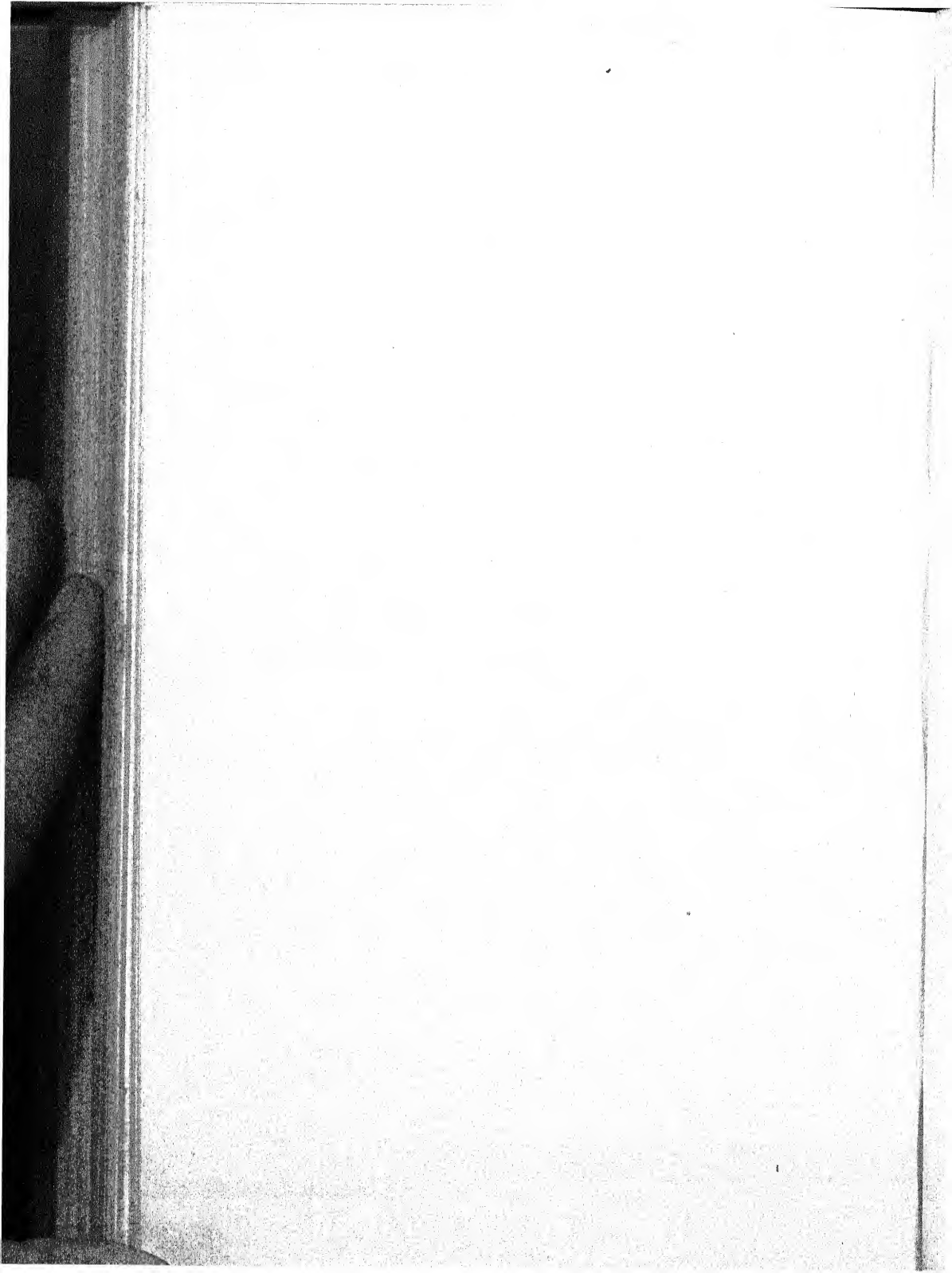
Naval stations: Bizerta, Bizerta (Karouba), and Tunis (Kasba).

Direction-finding stations: Bizerta (Seti Meriem) (Gonio) and Sfax.

Aeronautical stations: Tunis and Tunis (Aérogonio).

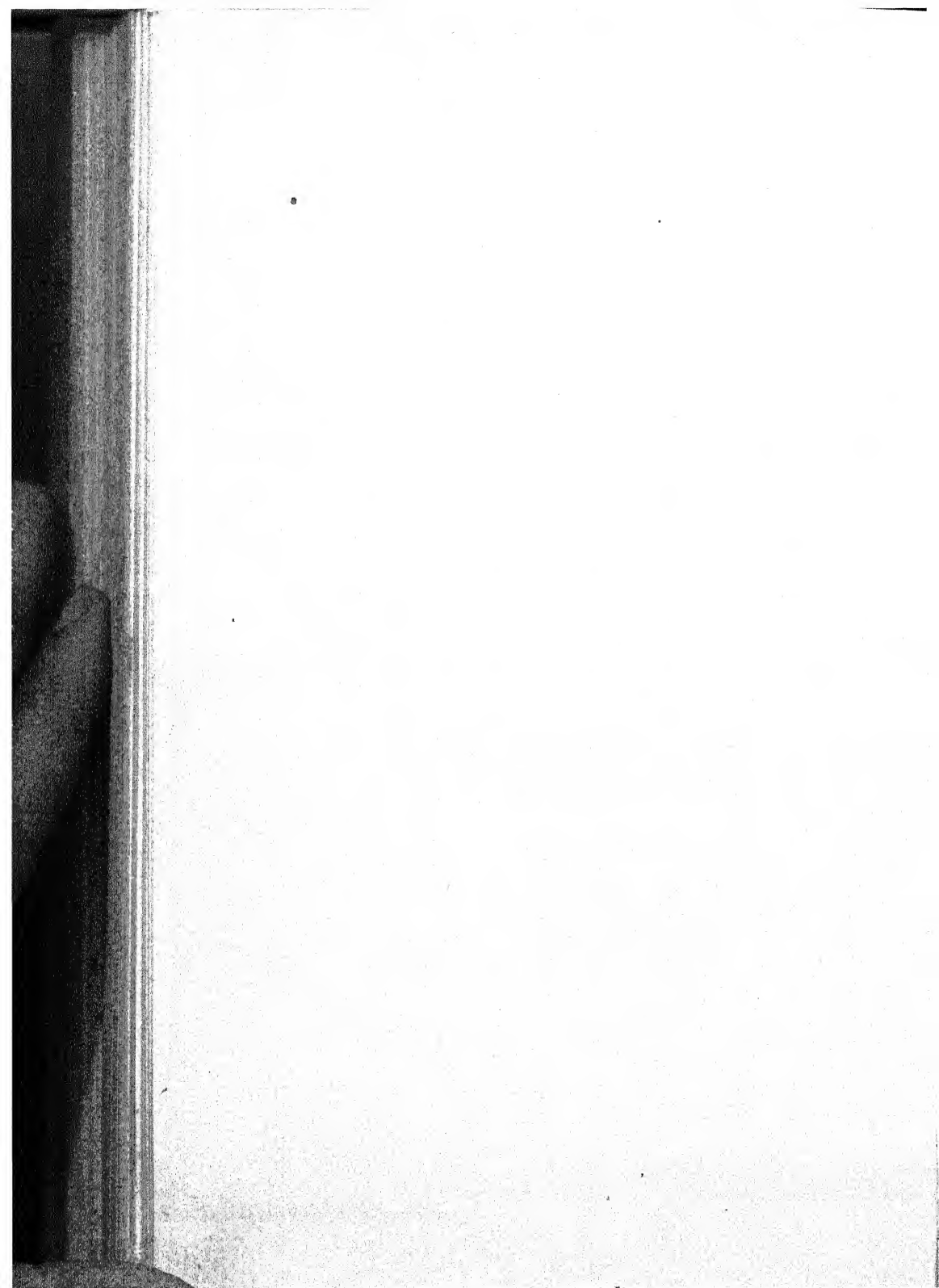
Commercial coast station: Bizerta.

Broadcasting station: Tunis (P.T.T.).



APPENDIXES

- A. STRATIGRAPHY
- B. CLIMATIC TABLES
- C. ROMAN TUNISIA
- D. THE TUNISIAN CAMPAIGN, 1942-1943
- E. NOTE ON CUSTOMS AND MANNERS
- F. THE MOSLEM CALENDAR AND FESTIVALS
- G. ADMINISTRATIVE DIVISIONS AND COMMUNES
- H. AGRICULTURAL STATISTICS
- I. OIL INSTALLATIONS IN TUNISIA
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- K. GLOSSARY
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AUTHORSHIP
- M. CONVERSION TABLES



APPENDIX A

STRATIGRAPHY

DETAILED stratigraphical subdivision of fossiliferous beds is excluded. The following rocks are exposed in Tunisia:

SEDIMENTARY ROCKS

QUATERNARY

These deposits occupy more than half the surface. For the most part they are of continental origin, but there are considerable areas of elevated marine beds, especially along the east coast. There are extensive areas of alluvial deposits in the river valleys, especially near the coast and on the coastal lowlands, where lagoons and basins have been, or are being, filled with silt, sand, and gravel. Inland many chotts are encumbered with similar deposits and with salty mud. Encrustations of lime (travertine), sometimes with gypsum, are common. Sand-dunes are widespread in the southern (Saharan) part of Tunisia.

PLIOCENE

The Tertiary beds are chiefly continental at the top (Pliocene and in part Miocene or Pontian); the remainder are marine. Pliocene beds are frequently difficult to distinguish from the Quaternary; they consist of continental clays and marls, gravels and conglomerates. There are marine Pliocene beds near the Golfe de Hammamet.

MIOCENE

Marine Miocene strata consist of alternating clays, marls, and sandstones, with some gypsum, deposited in restricted arms of the sea: Lower, Middle, and Upper Miocene beds are recognized.

OLIGOCENE

The Eocene-Oligocene sea extended southward only to the vicinity of Gafsa, and steadily retreated northward. Neither Oligocene nor Miocene beds are identified in the Saharan part of Tunisia.

White marine sandstones with nummulites are referred to the Oligocene, overlying Upper Eocene marine calcareous sandstones.

EOCENE

These beds are exposed especially in the Tell of northern Tunisia, in the Dorsale, and in the Algerian-Tunisian chains;

they are not identified south of the vicinity of Gafsa-Golfe de Gabès. They are marine, their facies changing from north to south.

Upper } In northern Tunisia marls and sandstones with nummulites
Middle } on limestones with *Globigerina*. In central Tunisia shelly limestone underlain successively by gypsiferous clay, marl, and massive limestone. Farther south gypsum overlies siliceous limestone containing flint nodules, phosphatic marl, and shelly fine-grained limestones.

Lower (Suessonian): In northern Tunisia varied limestones, some with *Globigerina*, overlie marls and limestones with nummulites: there are some phosphatic beds, and beds change facies laterally. In central Tunisia are limestones with phosphatic beds; north-east of a line from Souk el Arba to Kairouan are chalky *Globigerina* limestones, south-west of this line is crystalline nummulite limestone; marls are widespread. Farther south four beds of phosphate, interbedded with marl, rest on marly and shelly limestones; they are confined to a zone passing east-west through Gafsa.

CRETACEOUS

These beds mark the filling of an Algerian-Tunisian deep gulf and the spreading of a shallow transgressive sea southward over the Sahara and Libya, with Upper Cretaceous partial regression.

Upper These beds are widely exposed in the folds of the Tell, in the domes of the Tunisian Steppes, north and south of the Gabès gap and the Chott el Fedjadj, and thence southward into the Sahara. They are marine and in the north consist of Senonian marls with limestones, resting on Turonian limestones (with marl between upper and lower limestones); the Turonian beds rest in turn on Cenomanian marls with interbedded limestones. Towards the south marls are progressively more prominent, and some of them are gypsiferous.

Lower In folded structures the Lower Cretaceous marine beds are frequently revealed in the cores of anticlines and domes in the Tell and the steppes: they also outcrop along a north-south line in the hills and plateaux south of the Golfe de Gabès. They consist of successive marls, limestones, and sandstones in northern Tunisia, of marls and sandstones in central Tunisia, and, south of the Chott el Fedjadj, of clayey sandstone overlying gypsiferous marl, which alternates with sandstone and limestone.

JURASSIC

The outcrop of these marine beds in northern Tunisia is limited to the cores of a few anticlines. They are seen in a few areas of the Dorsale: in the south they crop out from beneath the Lower Cretaceous beds in the escarpments and plateaux south of the Golfe de Gabès in the vicinity of the Libyan frontier, where they probably form part of a narrow fringe; they are not found in the Sahara, and Jurassic beds in the interior of Libya are of continental (freshwater) type.

Upper } Limestone and shale: in Djebel Achkel schists alternating
Middle } with partially dolomitized reddish limestone and marble; metamorphism appears to have been hydrothermal. South-east of the chotts are gypsiferous clay, marl, sandstone, and partly dolomitized limestone.

Lower (Lias): Hard crystalline and siliceous limestone, with some oolite, banded limestone, and thin marls. Outcrops are limited to the highest parts of the Dorsale and a few massifs south-east of the chotts.

TRIASSIC

Continental and lagoonal red sandstones, limestones, dolomites, variegated marls and clays, gypsum, and salt are probably for the greater part Triassic, perhaps wholly so: Permian beds may be included. In the Tell and Steppes they are present below the Jurassic beds, but often they are not exposed in their normal stratigraphical place; dolomite overlies thin sandstones which alternate with massive gypsum and marl, thick lenses of salt underlie or interdigitate with the marl. Folding and superincumbent weight of beds have forced salt and some associated beds upward through overlying rocks, especially in the anticlines, where they simulate igneous intrusions. Their presence underground is widely indicated by salt springs. These rocks are exposed, emerging from beneath the Jurassic beds, in a considerable area athwart the northern part of the Libyan frontier, where the top bed is thick gypsum with sodium and potassium salts overlying dolomite, sandstone, limestone, and marl. The lowest member of the sequence is unfossiliferous red sandstone believed to be Permian.

METAMORPHIC ROCKS

Mica schist, quartzite, and marble, complexly folded, occur only at Djebel el Hairech in the core of a dome. Relations are obscure, but the marble appears to be much younger than the underlying metamorphic rocks.

IGNEOUS ROCKS

These are extremely rare in Tunisia. Interesting intrusions of granite diorite, gabbro, aplite, and other associated rocks, perhaps of Middle Miocene Age, are exposed in the Île de la Galite, where they are quarried for road metal. A few outcrops of lavas and some intrusions on the mainland south and east of Cap N gro are probably associated with them.

Altered basalt or dolerite (ophite) is associated with some of the Triassic beds.

MOUNTAIN-BUILDING MOVEMENTS

A distinction lies between the Alpine folds of the geosyncline, of which the southern limit is the Dorsale, and the domes and associated structures to the south of that feature which give place to the Saharan platform south and east of the great chotts.

Archaean-Pre-Cambrian and Palaeozoic rocks are concealed, but their north-south structural lines have been imposed upon overlying sediments, particularly in central and southern Tunisia.

THICKNESSES OF STRATA

Aggregate and generalized thicknesses are for the most part difficult to assess in Tunisia, and published figures are usually of local value. The following figures applicable in Algeria may serve as a general guide, although some of the higher estimates may be excessive for Tunisia: Pliocene, 4,000 feet or more; Miocene, 10,000 feet or more; Oligocene, 330-1,850 feet; Eocene, 3,000-3,500 feet; Cretaceous, 6,600-9,800 feet; Jurassic, 1,640-3,300 feet; Trias, no estimate.

APPENDIX B

CLIMATIC TABLES

Table	I. Wind Direction.
"	II. Average Number of Days of Sirocco, 1901-1920.
"	III. Number of Days with Gales per Season, 1924-1929.
"	IV. Mean Temperatures, Mean Daily Maximum Temperatures, and Mean Daily Minimum Temperatures.
"	V. Mean Temperatures of Coldest and Warmest Months, and Range of Temperature.
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"	VII. Average Amount of Cloud.
"	VIII. Number of Days per Season of Clear, Cloudy, and Overcast Sky, 1911-1920.
"	IX. Mean Rainfall.
"	X. Seasonal and Annual Amounts of Rainfall, 1901-1925.
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TABLE I. *Wind Direction (percentage of observations)*

(Times of observation, 0700, 1300, 1900 hours G.M.T.)

		J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.	Year (mean)
<i>Bizerta</i>														
Mean Force 0-9		3.3	3.5	3.5	3.6	3.2	3.0	2.9	3.0	2.8	3.0	3.1	3.3	3.2
Percentage of observations from	N.	8	10	7	8	11	8	10	10	12	10	7	6	9
	NE.	5	4	7	7	9	11	11	10	8	8	7	4	7
	E.	4	5	6	8	8	10	9	14	13	8	4	3	8
	SE.	8	6	7	8	6	5	5	5	8	7	6	7	6
	S.	7	7	9	6	6	5	4	5	8	10	10	7	7
	SW.	24	17	16	11	11	9	8	6	8	18	22	24	14
	W.	15	17	15	16	16	15	12	9	12	14	16	18	15
	NW.	27	33	32	35	32	35	38	39	29	23	26	30	32
	Calm	2	1	1	1	1	2	3	2	2	2	2	1	2
<i>Tunis</i>														
Mean Force 0-9														
Percentage of observations from	N.	9	7	6	7	11	9	9	11	10	7	9	7	9
	NE.	3	6	5	7	8	11	15	16	14	7	5	5	8
	E.	6	5	4	5	7	11	17	18	16	9	7	4	9
	SE.	6	7	11	12	11	12	8	8	12	12	12	8	10
	S.	6	6	11	8	7	6	5	5	6	7	7	8	7
	SW.	13	9	14	8	8	10	8	8	7	13	13	12	10
	W.	21	21	20	21	15	8	13	9	14	17	13	25	16
	NW.	35	39	29	32	32	33	22	21	18	24	31	30	29
	Calm	1	0	0	0	1	0	3	4	3	4	3	1	2

TABLE II. *Average Number of Days of Sirocco, 1901-1920*

	Winter	Spring	Summer	Autumn	Year
Bizerta . . .	4	7	9	8	28
Kelibia . . .	3	8	17	11	39
Sousse . . .	4	6	11	7	28
Gabès . . .	5	9	6	8	28
Djerba . . .	3	7	9	6	25

TABLE III. *Number of Days with Gales per Season, 1924-1929*
(Number of days per season with winds of force 8 or more)

Station	Winter	Spring	Summer	Autumn
Tabarka	3	2	0.1	1
Galitons de l'Ouest	0.2	*	0	*
Cap Serrat	1	0.2	0	0.3
Ras Enghela	0.3	0.7	0	0.1
Île Cani	3	2	0.5	1
Île Plane	3	1	0.1	0.7
Sidi bou Said	1	0.4	0	*
Cap Bon	0	0	0	0
Kelibia	0.3	1	0.1	1
Sousse	1	1	0.5	0.5
Îles Kuriate	1	1	0	1
Mahdia	1	2	0.3	0.7
Thyna	0	0	0	0
Bordj Djillidj (Djerba)	0	0	0	0
Ras Tourgueness (Djerba)	2	1	0.2	0.5

* less than 0.1

TABLE IV. *Mean Temperatures, Mean Daily Maximum Temperatures, and Mean Daily Minimum Temperatures (° F.)*

(A = mean temperature, B = mean daily maximum temperature, C = mean daily minimum temperature)

Station	Height above sea-level (ft.)	J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.	Year (mean)
Bizerta	10	A 53	52	57	60	65	72	77	79	75	69	62	56	65
		B 58	60	63	67	73	79	85	86	83	77	68	61	72
		C 46	47	50	53	59	65	71	72	69	63	55	49	58
Tunis	108	A 51	51	56	60	67	74	79	80	76	68	60	53	64
		B 58	61	66	70	77	85	92	93	86	78	69	62	75
		C 43	43	46	50	56	63	67	67	64	57	50	44	54
Thala	3,346	A 42	45	49	55	63	73	78	78	72	61	52	44	59
		B 49	57	58	68	76	87	95	94	85	72	62	53	71
		C 34	34	39	44	49	58	64	63	59	50	43	37	48
Dehibat	984	A 52	56	62	70	75	83	87	87	85	74	63	55	71
		B 60	67	75	86	93	101	105	105	101	88	74	65	85
		C 44	45	49	55	58	65	69	70	70	61	52	45	57

TABLE V. *Mean Temperatures of Coldest and Warmest Months, and Range of Temperature*

	Coldest month	Warmest month	Range
<i>Coastal stations</i>			
Bizerta	52	79	27
Tunis	51	80	29
Sousse	52	79	27
Sfax	53	80	27
Gabès	51	82	31
<i>Inland stations</i>			
Souk el Arba	48	83	35
Le Kef	44	81	37
Thala	42	79	37
Gafsa	47	87	40
Kebili	48	89	41

TABLE VI. *Seasonal Frequency of Thick Fog at Night**

(Observations at 2000, 2300, 0200 hours G.M.T.)

<i>Lighthouse</i>	<i>Number of days per season</i>			
	<i>Winter</i>	<i>Spring</i>	<i>Summer</i>	<i>Autumn</i>
Cap Serrat	7	6	9	8
Galitons de l'Ouest	19	9	9	23
Ras Enghela	30	25	20	23
Île Cani	19	16	13	18
Cap Bon	13	26	25	19

* For note on these observations, see pp. 78-79.

TABLE VII. *Average Amount of Cloud (Scale 1-10)*

(Monthly averages in tenths of the sky covered)

<i>Station</i>	<i>J.</i>	<i>F.</i>	<i>M.</i>	<i>A.</i>	<i>M.</i>	<i>J.</i>	<i>J.</i>	<i>A.</i>	<i>S.</i>	<i>O.</i>	<i>N.</i>	<i>D.</i>	<i>Year (mean)</i>
Bizerta	4.9	4.7	4.3	4.3	3.7	2.7	2.0	1.9	3.1	4.0	4.7	4.9	3.8
Tunis	6.9	6.6	5.5	5.6	5.0	3.6	4.3	4.2	5.7	5.3	5.5	6.2	5.4

TABLE VIII. *Number of Days per Season of Clear, Cloudy, and Overcast Sky, 1911-1920*

(Clear, cloudy, and overcast skies in tenths of the sky covered are respectively: 0-2, 3-7, 8-10)

	Winter	Spring	Summer	Autumn
Tunis: clear	30	46	65	38
cloudy	41	34	24	37
overcast	19	12	4	16
Sousse: clear	43	50	70	49
cloudy	30	22	15	29
overcast	16	20	7	14
Djerba: clear	56	58	70	59
cloudy	25	23	19	25
overcast	9	11	3	7

TABLE IX. *Mean Rainfall (inches)*

Station	Height above sea-level (ft.)	J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.	Year (mean)
Ain Draham	2,346	10.5	7.6	6.8	5.9	3.5	1.8	0.4	0.6	2.1	6.2	7.4	9.9	62.9
Bizerta	10	5.6	3.0	2.3	1.6	1.0	0.6	0.2	0.1	0.8	2.6	3.4	4.5	25.7
Tunis	108	2.2	2.0	1.9	1.5	0.9	0.5	0.1	0.2	1.0	1.9	2.0	2.4	16.6
Sousse	131	1.9	1.6	1.3	1.1	0.8	0.4	0.2	0.3	1.9	1.9	1.6	1.5	14.5
Kairouan	190	1.2	1.3	1.3	1.2	1.2	0.6	0.3	0.3	1.8	1.5	1.3	0.9	12.7
Thala	3,346	2.1	1.9	2.4	2.1	1.9	1.2	1.0	0.8	1.9	1.4	1.6	2.7	20.8
Sfax	230	1.1	0.7	0.7	0.9	0.5	0.2	0.0	0.1	0.9	1.1	1.1	1.0	8.3
Gabès	230	1.0	0.9	0.9	0.6	0.4	0.1	0.0	0.1	0.6	1.1	1.1	0.9	7.6
Gafsa	1,050	0.8	0.7	1.0	0.8	0.7	0.3	0.1	0.2	0.6	0.6	0.7	0.6	7.1
Dehibat	984	1.3	0.7	0.9	0.1	0.1	0.1	0.0	0.0	0.2	0.3	0.4	0.5	4.6

TABLE X. *Seasonal and Annual Amounts of Rainfall (inches), 1901-1925**

	Bizerta			Tunis			Sfax			Gabès		
	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	Min.
Autumn	6.4	12.2	3.3	4.9	9.8	1.9	3.3	7.5	1.1	2.6	7.4	0.0
Winter	9.3	20.9	4.4	6.3	14.0	1.3	2.5	5.7	0.1	2.4	8.3	0.7
Spring	4.1	8.5	0.4	3.8	7.8	1.3	2.1	5.1	0.6	1.8	5.9	0.2
Summer	0.9	2.6	0.2	0.8	2.9	0.1	0.2	1.5	0.0	0.2	2.4	0.0
Year	20.9	34.7	14.9	15.9	26.0	9.9	8.3	17.4	3.2	7.1	19.0	2.5
Extreme in one day	4.9			3.7			3.5			4.0		
Date	15.i.1906			11.xi.1911			19.iii.1917			20.x.1911		

* Maxima and minima are based on the period 1901-1920 in the case of the seasons, and on the period 1885-1920 in the figures for the year.

TABLE XI. *Mean Number of Rain Days**

Station	J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.	Year (total)
Bizerta	15	12	11	8	6	3	2	2	5	9	12	15	100
Tunis	11	10	9	7	5	3	1	1	4	8	9	9	79
Sousse	7	8	7	6	5	4	0	1	5	6	7	7	63
Thala	9	8	11	8	7	5	3	4	7	6	6	9	83
Gabès	4	4	4	3	2	2	1	0	2	4	4	3	33
Djerba	4	5	4	2	3	2	0	0	3	4	5	3	35
Dehibat	4	3	3	0.9	0.6	0.6	0	0	0.9	0.5	2	2	17

Additional figures (number of rain days per annum), for which monthly detail is not available, are: Ain Draham 126, Béja 112, Tabarka 102, Kairouan 45, Sfax 45, Tozeur 25.

* Day with trace or more rain: amount generally unspecified, but probably 0.1 mm. or more.

TABLE XII. *Relative Humidity (percentages)*

Station	J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.	Year
Bizerta	75	74	72	70	68	65	66	63	68	70	73	75	70
Tunis	76	75	72	69	65	59	55	59	65	72	74	76	68

TABLE XIII. *Mean Number of Thunderstorms per Season**

Station	Winter	Spring	Summer	Autumn	Year
Tabarka	3.2	2.4	1.4	1.2	8.2
Ain Draham . . .	5.3	10.3	7.3	5.3	28.2
Bizerta	3.0	3.2	2.8	5.8	14.8
Tunis	3.8	4.0	1.6	4.8	14.2
Kelibia	2.2	2.0	3.6	4.2	12.0
Grombalia	1.0	1.6	2.4	2.4	7.4
Sousse	0.8	1.4	2.6	4.2	9.0
Sfax	1.2	2.0	1.2	4.4	8.8
Gabès	0.6	1.0	1.0	2.4	5.0
Djerba	1.2	2.0	1.0	5.0	9.2
Ben Gardane . . .	0.4	0.8	0.2	0.8	2.2

* Period: 20 years. All are coastal stations except Ain Draham, Grombalia, and Ben Gardane.

APPENDIX C
ROMAN TUNISIA

(Fig. 28)

Roads

ROMAN Tunisia acquired by A.D. 200 a complete road system which is remarkable for the fact that few of the roads originated as military roads. At the formation of the enlarged province of Africa Proconsularis (p. 128) the steppes contained unpacified tribal elements which were a danger to security, but the Tell had been fully pacified and was a region of colonial settlement. The military focus was really in Algeria: hence the winter quarters of the legionary garrison were fixed in the south-west at Ammaedara (mod. Haidra) and a main road was built to link the camp with the port of Carthage (class. Carthago). The southern steppes were opened up by another road which led southward probably by Cillium (mod. Kasserine) and Capsa (mod. Gafsa) to Nepte (mod. Nefta) on the Chott Djerid. But all the military garrisons were moved into Algeria to Theveste (mod. Tébessa) after A.D. 70, and the development of the road system was generally the work of the municipalities, which built roads through their municipal territories to link with their neighbours. Thus the roads of Africa Proconsularis were better adapted to the economic needs of the province than is usual in the Roman Empire. Generally they were intended to link the fertile regions of the interior with the sea. The difficult mountain road from the Medjerda valley to the port of Thabraca (mod. Tabarka) served the marble quarries of Simitthu (mod. Chemtou). A road might be marked out and given mile-posts long before it was paved. The route from Carthage to Ammaedara, for example, was not paved until A.D. 123. In the drier south many roads were never paved.

The network consisted of three systems, serving the Tell, the High and Low Steppes, and the oases. In the Tell the grain of the country dominated the pattern, and the major routes followed the river valleys. In the High Steppes relief still controlled the pattern, but in the Low Steppes roads tended to disregard the grain of the country and take a direct course to the coast. In the oasis region natural features were again dominant (Fig. 28).

The Tell Roads. The principal roads were as follows:

(1) From Carthage a road followed the main course of the Medjerda (class. Bagradas) along the left or north bank to Simitthu, though it took a short cut behind Djebel el Ang to avoid the southward bend of the river. Beyond Simitthu it continued eventually to the coast at Hippo Regius (mod. Bône) in Algeria.

(2) The military highway from Carthage to Theveste entered the Medjerda valley at Thisiduo (mod. Krich el Oued) and, keeping to the right or south bank, followed the Oued Kralled tributary of the Medjerda and

crossed the plain of el Ghorfa to Assuras (mod. Zafrane) in the plain of le Sers and thence to Althiburus (mod. Medeina) in the open plains south of le Kef: it then climbed the watershed to the valley of the Oued Sarrath in which lay Ammaedara and Theveste. From Mustis (Henchir Mest) a branch road served Sicca Veneria (le Kef) and continued to Naraggara (Ksiba Mraou) on the Algerian frontier; the main route was doubled between Mustis and Althiburus by an alternative route north-west of Djebel Lorbeuss, which served Lares (Henchir Lorbeuss).

(3) The fertile Miliane valley was served by a road from Carthage which, west of Thuburbo Maius (Pont du Fahs), followed the open country north of Djebel Mansour to the Siliana valley and so reached the Carthage-Theveste road near Thubursicum (Teboursouk).

The absence of roads crossing the Dorsale between Zaghuan and Maktar is noteworthy, despite the number of settlements in the upper Miliane valley.

The Steppe Roads. The road system of the steppes may be compared to the fingers of a hand with the base line formed by the route linking the road centres of Theveste, Cillium, Sufetula, and Aquae Regiae. The principal object of these roads was to link the oil-producing regions of the interior with the ports. The road from Theveste to Aquae Regiae generally followed the grain of the land through the broad valleys of the Oued el Hatab and the upper Oued Zeroud from Theveste to Cillium (Kasserine) and Sufetula (Sbeitla), and thence to Aquae Regiae (near Pichon) at the foot of Djebel Trozza. Thence two branches ran north through the mountains to Maktar (Maktar) and Zama Regia respectively, and eventually both met on the main Carthage-Theveste highway near Assuras (Zafrane). A road led directly south from Assuras through the Oued el Hathob valley to Sufetula (Sbeitla).

The other roads of the Low Steppes call for little comment except that the road from Cillium (Kasserine), on the Theveste-Aquae Regiae road, to Thelepte (Thélepte, near Fériana) and Capsa (Gafsa) made use of the Fériana gap. A coastal road from Hippo Regius (mod. Bône) in Algeria to Tripolitania followed the coast fairly closely, except where it cut across the base of the Cap Bon peninsula, which was served by a branch road on its eastern side.

The Oasis Roads. These consisted simply of routes branching from the Capsa-Tacapae road to serve the inhabited centres of the region of the chotts, and also of the continuation of the coastal road into Tripolitania.

Towns

Except for the coastal mountains, the Tell of northern Tunisia was densely settled and actively cultivated in Roman times. In the olive-growing steppes of central Tunisia south to the zone of Thelepte (near Fériana) and Sufetula (Sbeitla), cultivation and population were still extensive though

diminished. South of this zone towards the chotts, where pastoral conditions survived longest, settlement was thinner and olive cultivation more limited. The olive-growing Sahel from Hadrumetum (Sousse) to Taparura (Sfax) was densely cultivated and populated. Though there were many scattered farmsteads and villages, the small town was the characteristic unit of civilization.

The towns were not industrial centres; their wealth was based on agriculture. Their population included the wealthy landowners, small farmers, and tenants whose lands were within reach of the town. But all the inhabitants of the city territory (*territorium*), whether they lived inside or outside the town, were fellow citizens (*municipes, cives*) of the community, voted for the local magistrates (*duoviri, aediles*, and *quaestores*—judges, executive officials, and treasurers) or councillors (*decuriones*) at yearly elections, and enjoyed the various festivals, public games, and theatrical shows which took place in the town. The whole unit was called either a *civitas*, a *municipium*, or a *colonia*. These terms were simply grades of civic dignity and meant 'borough'; the town itself (*oppidum*) was the administrative and economic centre of the self-governing borough in the midst of which it lay. Strictly speaking a *colonia* was a settlement of colonists from Italy or of Roman legionary soldiers, who were sometimes settled on the land when their military service was finished; during the second century A.D., however, it became an honorary title.

The Roman towns of Tunisia were all very much alike, both in layout and individual buildings. They were usually entered by a triumphal arch, which marked the power of the Roman Empire. The centre of municipal life was the *forum* or town square, where town meetings were held. This was surrounded by public buildings: the *curia* or town hall where the town council (*ordo*) met, the *basilica* or court of justice where the chief magistrates (*duoviri*) held their court, and usually a 'Capitoline' temple (*aedes*) representing the official cult of the Roman State, dedicated to the Roman triad of Jupiter, Juno, and Minerva, and another for the worship of the Emperors, who were regarded as semi-divine beings. Elsewhere in the town would be numerous other temples, those of the Phoenician deities Baal (Saturnus) and Tanit (Dea Caelestis) showing an interesting mixture of Carthaginian and Roman elements. Another group of buildings, often on the outskirts of the town, provided for amusements: a theatre (open to the sky), sometimes an amphitheatre or 'circus', a library, and public baths: these last (*thermae*) were huge vaulted buildings with an elaborate arrangement of saloons. The necessities of life were provided by markets (with separate shops or stalls), public fountains, paved streets with side-walks and sewers beneath the pavements, and public latrines. The main street was often colonnaded against the sun. The private houses of the wealthy were built around small courts (*atrium*), sometimes colonnaded; the poor lived in tenement-like blocks. Water-supply was carefully maintained either by bringing water through an aqueduct from a spring sometimes many miles

away, or by storing it in huge underground cisterns, many of them still in use. This water was a luxury for personal use and not for agricultural irrigation.

Fortifications. In the peaceful parts of the Roman Empire, during its hey-day, fortifications were not required; hence the cities of which there are substantial remains are unwallled. After the Vandal invasion and the Byzantine reconquest conditions became much more insecure, and walls and fortresses were built. Small square fortresses resembling medieval castles are common in Tunisia.

Churches. After the recognition of Christianity as the official religion by Constantine in A.D. 326 there was a great period of church building in north Africa. Often the materials, particularly the pillars, were taken from pagan temples. Many sites are dominated by the ruins of large churches of the basilica type—a long pillared hall with an apse at the east end—dating from the fourth to the seventh centuries. Characteristic features are the martyr's tomb, usually in an antechapel at the west end, and the baptisteries.

The following list includes the most interesting ruins of ancient settlements, which are very numerous, particularly in the Tell. Generally the majority of buildings date from A.D. 100–230: the Byzantine castles and churches date from A.D. 533–640, though there are some pre-Byzantine churches of the fourth and fifth centuries.

Althiburus (mod. Medeina) in the High Tell, some 20 miles south-east of le Kef and approached by a track from Ksour, has a large and well-preserved forum and Capitoline temple: ruins of private houses are extensive but confused; the theatre is ruinous.

Ammaedara (mod. Haidra), the centre of a rolling plain amid the High Tell and built on ground which slopes gently down to the Oued Sarrath, was originally the headquarters of the African legion, but after its departure to Algeria (Numidia) about A.D. 70 became an ordinary Roman municipality. The extensive ruins include a fine triumphal arch where the Carthage road entered the town, two churches, a large and impressive Byzantine fortress with its own chapel, several interesting and intact mausoleums, and a second smaller arch beyond the oued.

Bulla Regia, 4 miles north of Souk el Arba in the rich countryside of the Medjerda valley, is noted for its large baths and cisterns, and especially for its villas, buried deep in the ground and apparently intended as cool summer quarters rather than tombs; they are among the few perfect examples of the Roman house in north Africa (Photo. 91).

Carthago (mod. Carthage) lay at the end of a long narrow peninsula, since in ancient times the coastline was to the west near Ariana. Very little is to be seen of the ancient city, which in size was comparable to Rome, but some churches, villas, and theatres have been excavated, and the plan of the tiny naval harbour can be traced near the shore. Of greater interest are the Phoenician tombs on the Bursa (Colline de St. Louis),

which was the centre of Carthaginian Carthage, and the Carthaginian antiquities of the Musée Lavigerie.

Gigthis, near Bou Grara on the western side of the Golfe de bou Grara, was in ancient times the port for the Île de Djerba and is one of the best sites in Tunisia, containing forum, curia, basilica, Capitoline and other temples, baths, and a market. The town shows the adoption of the Roman town-forms by a mixed Berber and Phoenician population.

Sufetula (mod. Sbeitla), on the fringe of the High Steppes, is an example of the 'oil-towns' that sprang up in this now deserted countryside. Ruins, generally confused, cover a large area along a oued, but there are several Christian basilicas, a fairly well-preserved theatre built into the oued bank, and, in a great walled enclosure measuring 197 by 200 feet, three nearly perfect temples side by side (Photo. 90). The ruins are entered by a fine triumphal arch of about A.D. 300, and north of the town a triple-arched aqueduct crosses the oued (Photos. 93, 94).

Thuburbo Maius, 2 miles north of Pont du Fahs station, is built on a rocky hill above the wide Miliane valley. Established as a colony of Italian veterans by Augustus, it represents a model Roman town. The forum, Capitoline temple, market, baths, of which there are two sets, both 'winter' and 'summer', and the colonnaded square called the Portico of Petronius, are all on a fairly grand scale (Photo. 81). The small and interesting temple of Baal, enclosed within a precinct wall, shows the influence of Carthaginian civilization on Roman immigrants. The private houses are notable for the attractive patterns of their mosaics, of which many are still in position.

Thugga (mod. Dougga), picturesquely situated amid olive-groves above the Oued Kralled valley, is the complement of Thuburbo Maius. It was a native Berber or Numidian village which during the second century A.D. was transformed into a Roman town, and is notable even in north Africa for its excellent state of preservation. The old town was a maze of narrow alleys, but demolitions evidently made room for the Italian-style forum, the Capitoline temple, and the baths, of which several halls are still roofed (Photo. 82). Several small temples of Fortune, Concord, and Mercury show the mixture of Roman and Cathaginian ideas, and north of the town is a large temple of Baal. To the west is an unusual temple of the Carthaginian goddess Tanit surrounded by a semicircular portico (Photos. 86, 176). The Roman theatre and the so-called slave market are well preserved, and also the small and attractive 'Greek' theatre, probably a lecture hall (Photo. 88). Two small arches gave entrance to the town, which has several large villas, some with complete rooms. Below the town stands the unique Libyco-Carthaginian mausoleum, monument of a Numidian king in a mixed style of architecture (Photo. 92).

Uthina (mod. Oudna), built on a hill above the Miliane valley and approached from Oudna station, is a site of secondary importance, but notable for the great hollow occupied by its amphitheatre, for its Byzantine

fortress and church, and for the huge system of underground cisterns, which were supplied by a small aqueduct. The town was small but wealthy, and supplied some of the finest mosaics of the Musée Alaoui at le Bardo.

Other Monuments

There are many impressive individual buildings of Roman origin such as the huge amphitheatre, resembling those of Italy and Provence, at el Djem (class. Thysdrus) (Photos. 85, 87); the great aqueduct from Djebel Zaghouan to Carthage, of which many miles still stand outside Tunis (near the tram route to le Bardo) and in the Miliane valley near Oudna (Photo. 83); the nymphaeum or water temple by the source of the aqueduct at Zaghouan (Photo. 84); the Christian catacombs at Sousse; the Romano-Carthaginian harbour at Mahdia; the great Byzantine fortress of Bordj Hellal, 5 miles east of Chemtou in the Medjerda valley; the triumphal arch of Trajan at Maktar; and the huge baths of Thélepte, near Fériana, another large ruined 'oil-town' of the steppes like Sufetula. The Musée Alaoui at le Bardo near Tunis contains an impressive collection of pictorial mosaics illustrating every phase of ancient life, and often of great artistic worth (Photos. 95-98). Many other objects, particularly the great collection of decorated oil lamps are of interest and reveal the mixed Romano-Carthaginian civilization of Africa Proconsularis.

APPENDIX D

THE TUNISIAN CAMPAIGN, 1942-1943

BACKGROUND OF THE CAMPAIGN

THE occupation of French North Africa by the Allies was planned in June 1942, when the Eighth Army was falling back to el Alamein. The passage of the Mediterranean was almost closed to the Allies: Malta held out and was supplied only with great difficulty and heavy loss. The Middle East and India could be reached only by way of the Cape: the U-boat war was stretching Allied resources at sea to the uttermost: convoys to Archangel and Murmansk had to fight for much of the distance.

The two main tasks were to keep the bases intact, that is, Great Britain, the Middle East, and India, and to ease the burden on Russia by attacking the Axis in the west. The opening of the Mediterranean and the freeing of Africa were essential preliminaries: they could be achieved only by the Allies holding the airfields of French North Africa, Libya, and Egypt, from which the Mediterranean could be controlled and shipping protected between Gibraltar and Suez.

It was essential, moreover, that the Axis should be prevented from reaching the Persian Gulf through Asia Minor, Syria, or Palestine, cutting thereby the southern supply route to Russia and opening the land route to India. This was achieved by the attitude of Turkey and by the occupation of Iraq and Syria. The enemy's left arm was thus paralysed: his right, within striking distance of Alexandria, Cairo, and the Suez canal, was broken at el Alamein.

The victorious advance along the Mediterranean coast of Egypt and Libya to Tripoli forced the Axis Powers back on their bases, but shortened their communications. The Royal Navy destroyed a high percentage of enemy shipping in the central Mediterranean and, as airfields fell into British hands, the air attack on enemy air, sea, and land communications was intensified.

It was doubtful, however, whether Axis forces in north Africa could be brought to battle and totally destroyed by a British advance from the Middle East. At Washington, therefore, in June 1942, a couple of assaults had been planned: victory in the east was to be the prelude to a major attack in the west. The battle of el Alamein was followed swiftly by the Anglo-American landings in French Morocco and Algeria (8 November), which achieved rapid and complete success. On 11 November Admiral Darlan ordered all resistance to the Allies to cease in Algeria, Morocco, and Tunisia: it was agreed, moreover, that the French troops, of whom General Giraud assumed command, should assist the Allies.

In this fortunate circumstance there was a prospect that Tunisia might be

overrun before it could be effectively occupied by Axis troops. If it could be overrun, the total destruction of Axis forces falling back from Tripoli would be ensured. Africa would be entirely freed, the southern side of the Mediterranean would be cleared, and the sea route opened.

The difficulties of such an occupation were very great. The British First Army was as yet barely one division (the 78th) and the bulk of the American forces, which had occupied Casablanca and Oran, were not available. Roads were poor, railways quite inadequate, there were no adequate forward airfields, and the weather was due to break in less than a month.

Following the Allied landings in Morocco and Algeria, the enemy was pouring troops into Tunisia by air and sea: heavy losses were inflicted on him by the Royal Navy and the Royal Air Force, from Malta and elsewhere, but by mid-November his numbers in Tunisia were growing by 1,000 a day. Moreover, from his bases in Italy and the Italian islands he made damaging air attacks, as well as from the Tunisian airfields, all of which were in his hands. French forces in Tunisia were divided. The French Resident-General and naval commander at Bizerta (Admiral Estéva) obeyed orders from the Vichy Government and did not actively oppose Axis landings. Nevertheless, some steps were taken that were likely to be of assistance to the Allies, and French troops in Tunisia hastily organized resistance to the Axis.

In Algeria the decision to advance and to occupy Tunisia, in spite of the formidable difficulties, was pursued with speed and the utmost energy. The ensuing campaign was very closely related to the physical geography of the country (*see* Chapter II) and to its communications (*see* Chapters XV and XVI and the map in the pocket) which are also in large measure governed by the terrain. The sequence of events from the battle of el Alamein and the Allied landings in French North Africa to the surrender of the Axis armies is shown in Fig. 72.

DEVELOPMENT OF THE CAMPAIGN

The campaign in Tunisia opened while the Eighth Army was advancing across Cyrenaica, and therefore too far away to be of direct assistance. The Axis had to undertake heavy and immediate reinforcement and the occupation of Tunisia, and, as the Allied armies in north Africa were built up, they called for the deflexion of men and material which might otherwise have been available to Rommel's retreating army.

When the onrush from Algeria was checked by rapidly growing enemy strength, and movement was restricted by winter mud, the Eighth Army systematically broke into southern Tunisia, gravely hampered at times by the sporadic rains of the south.

Axis strategy was devoted to keeping the Allied armies apart, in which it was thought the Mareth position would play a lasting part. There was reason to suppose, indeed, that the Eighth Army might be held there while

the Allied forces in French North Africa were dealt a crippling blow. Thus Tunisia was to become an African stronghold and there was no thought of evacuation.

ALLIED FORCES, FRENCH NORTH AFRICA

EIGHTH ARMY

	1942	1942	
		23 October-3 November	Battle of el Alamein
Landing on Moroccan and Algerian coasts	8 November		
French resistance ends	11 November	11 November	Egyptian-Libyan frontier reached
Occupation of Bône	12 November		
General advance begins	24 November	20 November	Benghazi occupied
Allies' advance held at Tebourba	3 December		
Allies occupy Faid	3 December		
Allies' defence of Medjez el Bab	6-14 December	12 December	El Agheila occupied
	1943	1943	
		23 January	Tripoli falls
		29 January	Axis occupies Mareth position
Axis armour from Mareth occupies Sidi bou Zid, Gafsa, Sbeitla, Kasserine, Fériana, but is held before Tébéssa and Thala and withdraws	14-23 February	14-23 February	Axis armour detached from Mareth attacks U.S. 2nd Corps
German attacks between the north coast and the Ousseltia valley	26 February-22 March	21 March	Mareth position attacked
U.S. 2nd Corps advances through Gafsa	17-23 March	26 March 5 April	El Hamma occupied Wadi Akarit (Oued el Akarit) forced

COMBINED ADVANCE

8 April	Meeting of Eighth Army and U.S. patrols on Gafsa-Gabès road
10 April	Kairouan by-passed, Sfax occupied
12 April	Sousse occupied
20 April	Enfidaville occupied
20 April-5 May	Allies attack all along the line, from north to east coast
6 May	Final assault begins
7 May	Bizerta and Tunis fall
11-13 May	Surrender of Axis armies in the Zaghouan and in the Cap Bon peninsula

FIG. 72. *The Tunisian campaign, 1942-1943*

The forcing of the Mareth and Wadi Akarit positions was followed by the junction of the Allied armies, but it must be remembered that the enemy had already succeeded in one important matter, namely the withdrawal of his eastern armies, mauled but not destroyed by the Eighth Army, and the effecting of a junction with forces already in Tunisia. The fortress was thus garrisoned, but its outer defences were broken.

The two Allied forces, having effected a junction, were used as a single co-ordinated instrument. The combined advance into the fortress consisted of the clearing of the steppes, the enemy withdrawing into a stronghold, the perimeter of which ran along the mountain walls from the Golfe de Hammamet near Enfidaville, the Zaghouan, northward across difficult country of the eastern High Tell to Medjez el Bab, thence over the mountains of northern Tunisia to the north coast. Evacuation still formed no part of the plan.

When the breaching of the perimeter was achieved the enemy withdrew into the inner keep, Cap Bon and the Zaghouan, abandoning Bizerta and Tunis. Here evidently he intended to make a prolonged stand to impose delay on the invasion of Italy, which must be the sequel: evacuation again was no part of the plan, and in any event by this time was impossible because he had lost control of the Sicilian channel.

Swift Allied action and confusion robbed him of his last stand: Cap Bon was cut off from the mainland and overrun, and with it went the dumps that had been made there. The large force cut off in the Zaghouan surrendered to avoid destruction. The battle of Tunisia cost the enemy 340,000 men, vast supplies of material, and heavy losses in aircraft and shipping.

The following notes illustrate briefly each phase of the campaign. Mention of the actions of regiments and smaller units is impracticable; so far as possible the text refers to divisions, occasionally to brigades and to some other formations.

PHASES OF THE CAMPAIGN

(i) *The First Army's Advance on Tunis*

Following the decision to advance immediately on Tunis, British troops were landed at Bône, about 300 miles east of Algiers and 150 miles west of Tunis, on 12 November and, three days later, American parachute troops were dropped at Youks-les-Bains near Tébessa to secure the airfield and petrol stores. On 14 November British parachute troops were dropped at Souk el Arba to cover the advance and to support the French units in Tunisia who were resisting the enemy.

Meanwhile the enemy occupied Tunis, Bizerta, Sfax, and Gabès, despite heavy losses in transit, and towards the end of the month numbered about 20,000 men; first came the ground staff of the Luftwaffe with anti-aircraft and anti-tank units, followed by echelons of the German 10th Panzer and 334th Infantry Divisions and the Italian 1st (Superga) Division, building up the 5th Panzer Army under General von Arnim.

On 18 November advancing British elements were attacked by tanks and infantry at Djebel Abiod. The attack was repelled and heavy casualties inflicted. In the following days enemy columns attacked various Allied forces in the forward areas. By the evening of 24 November the First Army

under General Anderson had started a general advance in spite of as yet incomplete organization of the extremely difficult lines of communications. The troops available were the 78th Division, advancing rapidly in most difficult circumstances, the mixed Anglo-American force, including parachute troops and some field artillery, which had reached Béja, 450 miles by road from Algiers, and the French troops from Tunis, located at Medjez el Bab.

A British column on the left, operating from the region of Djebel Abiod, advanced on Mateur, and another on the right, with some French troops, advanced on Medjez el Bab from Béja. Between them a mixed British and American armoured force ('Blade Force') was directed from Souk el Arba.

'Blade Force' penetrated to a point midway between Mateur and Tebourba on 25 November and next day forty Axis aircraft were destroyed on the landing-ground of Djedeida. The right-hand column advanced down the Medjerda valley, occupying Medjez el Bab and Tebourba, freeing 'Blade Force' thereby to operate south-east of Mateur. Pressure was maintained on the enemy north-west of Mateur and in Djedeida on 29 November, but progress was slowed down by demolitions and by attacks by low-flying enemy aircraft. A British parachute unit was successfully dropped in the area of Pont du Fahs, and patrols operated along a line from Tebourba through Massicault to Cheylus and Oudna.

On 30 November the left-hand British column unsuccessfully attacked a strong point north of Jefna which commanded the Djebel Abiod-Mateur road: it repulsed an enemy counter-attack next day, when the Allied positions near Tebourba were also attacked. 'Blade Force', between Mateur and Tebourba, had to withdraw south-west of Medjez el Bab, suffering casualties to tanks: a Combat Command of the U.S. 1st Armoured Division was brought up from reserve. By the evening the enemy withdrew to the north.

Enemy patrols overran Oudna, Cheylus, and Depienne and reoccupied Pont du Fahs. Farther south the U.S. parachute troops dropped at Youks-les-Bains, in company with French forces in that area, patrolled as far south as Gafsa and as far east as Faïd, which was captured on 3 December.

Fighting around Tebourba on 2 December was indecisive, but on 3 December the enemy, strongly reinforced, forced the British right-hand column to withdraw to the high ground west of Tebourba, where a bitter resistance ensued and Medjez el Bab was held.

The race to take Tunis before the enemy could build up a substantial force had been lost: reinforcement and supply of Allied troops in the forward areas were extremely difficult over the long and unsatisfactory lines of communication and local air superiority was in enemy hands, but Medjez el Bab, the key to the plain of Tunis, was held and remained in Allied hands.

(ii) *The First Army's Stand and Build-up during the Winter*

With the initiative temporarily in his hands the enemy devoted the next four months to attempts to drive the Allies from their positions, first by attacking Medjez el Bab, next by pushing between the British and French sections in the Oued el Kebir and Ousseltia valleys; then by striking at the American forces in a drive for Tébessa, and lastly by a general offensive in the north, particularly against Béja. Allied attacks were limited, tactical, and exploratory.

The offensive on Medjez el Bab lasted from 6 December to 14 December and took place in very bad weather. Most of the Allied Air Force was grounded by mud on its improvised airfields; it had only one good airfield, that at Souk el Arba, anywhere near the front. The enemy suffered no similar disadvantage; he operated from permanent bases in Sardinia and Sicily, possessed the main Tunisian airfields, and could use as runways the wide main roads of the country round Tunis. The attacks were repulsed and Medjez el Bab held, but the high ground north of the town, in particular Djebel el Ahmera, 'Longstop Hill', was lost: the withdrawal, covered by 'Blade Force', cost the Americans heavily in tanks and transport. Till the end of the year Longstop Hill was the scene of bitter fighting.

Meanwhile the French hung on on the right and consolidated a line along the hills on the eastern side of the Ousseltia valley and withstood attacks particularly around Pichon and Fondouk.

On 18 January the enemy attacked the British at Bou Arada and the French in the Oued el Kebir and Ousseltia valleys. His intention was to drive a wedge between the British and the French, threatening the British right flank thereby and widening the east coast corridor. He intended also to deprive the Allies of their observation posts on the hills overlooking the plain of Kairouan and to secure the passes through which the roads lead on to the plain.

Striking south-west from Pont du Fahs he penetrated the French defences to a depth of 10 miles. Allied reinforcements were brought up and the position was stabilized along a line covering Robâa and running southward to the west of Ousseltia. On 3 December British parachute troops, fighting as infantry, and French legionaries attacked and took Djebel Mansour, south of Bou Arada and commanding the Pont du Fahs-Robâa road. Eventually the hill had to be abandoned owing to counter-attacks and infiltration.

A short lull now ensued in Tunisia; it coincided with regrouping and changes in command within the Allied forces, made possible by the approach of the Eighth Army which had occupied Tripoli on 23 January, and had crossed the frontier into Tunisia. Rommel, having withdrawn his main forces to the Mareth position by the end of the month, had made good his retreat and effected a junction with von Arnim's divisions in Tunisia. The enemy therefore held interior lines from Mareth to the north coast of Tunisia: co-ordination between the Allied armies was now possible

and would be essential to break into these lines and 'drive the enemy into the sea'.

Under General Eisenhower's supreme command, General Alexander, as his deputy Commander-in-Chief, assumed command of the 18th Army Group on 20 February. It comprised the First Army under General Anderson, the Eighth Army under General Montgomery, the U.S. 2nd Corps under Major General Fredendall, and some Saharan forces of the French Army, but the main French force, constituted into the 19th Corps under General Koeltz, formed part of the First Army. The air command was also reorganized under Air Chief Marshal Tedder, responsible to General Eisenhower, having under his command the North-west Africa Air Force (Lieut.-General Spaatz), the Tactical Air Force (Air Vice-Marshal Coningham) supporting the 18th Army Group, and the Strategic Air Force (Major-General Doolittle). Admiral of the Fleet Sir Andrew Cunningham, who already, under General Eisenhower, commanded the British and U.S. naval forces in north-west African waters, extended his command to include all cognate operations in the Mediterranean.

(iii) *Axis Attacks between the North and the Chott Djerid*

Rommel's withdrawal into southern Tunisia, and the impending junction of his forces with von Arnim's, emphasized the change of strategy in Tunisia: the earlier Allied efforts to occupy Tunis and prevent the building-up of an enemy army in the country gave place to the prevention, if possible, of the junction of the two Axis armies. This the Allies were not strong enough to do. Von Arnim, on the other hand, exerted every effort to force back the Allies and to secure and broaden the east coast corridor.

The first attempt was an armoured thrust launched from Faïd on 14 February. The force was recruited partly from von Arnim's armies (elements of the 10th Panzer Division), but it was carried out by Rommel who, having occupied the Mareth line which he expected to hold, detached much of his armour (21st Panzer Division and Centauro Division) and sent it to Faïd. The objective was the communications centre and supply base of Tébessa, loss of which might have involved the withdrawal of the First Army along the whole Tunisian front. Von Arnim intended to exploit any such withdrawal by attacking along the east-west roads in north-central and northern Tunisia: he grouped his forces for the purpose and awaited the outcome of Rommel's thrust.

The attack, supported by dive bombers, fell on the U.S. 2nd Corps near Sidi bou Zid and after heavy fighting the U.S. 1st Armoured Division was forced back, suffering severe losses. The enemy occupied Gafsa without resistance on the same day.

An American counter-attack on 16 February achieved considerable success, but next day the enemy continued the offensive and fought his way into Sbeitla: the Americans again suffered losses, including much of their transport. Sbeitla, Kasserine, and Fériana, including three valuable air-

fields, had to be evacuated: American and French forces farther north had to fall back to conform to the withdrawal. There was sharp fighting at other points. On 19 February a mixed force including a Guards Brigade, a British Tank Brigade (with Churchill tanks), and French troops fought a successful action at Sbiba, but next day the enemy secured the Kasserine pass and was, therefore, almost within reach of his objective, Tébessa. On 21 February he put in a two-pronged attack, north-westward and westward: the Americans repulsed the first, and in the Thala area a small British force switched from the First Army with the artillery of the U.S. 9th Division reinforced the American troops on the ground and the enemy was forced back.

On 23 February the enemy began to withdraw, suffering heavy casualties but laying extensive minefields, and two days later the Kasserine pass was clear. The main objective had not been secured, but very severe losses had been inflicted on the U.S. 1st Armoured Division, and the coastal corridor was assured for some time: it was not threatened from the west until mid-March.

Von Arnim, who had awaited the outcome of the thrust towards Tébessa, decided to carry out his plan of simultaneous attacks in an endeavour to force a general withdrawal in the north. The attacks started on 26 February and lasted nearly a month and were as follows: (1) westward along the coastal road towards Cap Serrat; (2) southward along the track from Kef Zilia to Sedjenane; (3) westward along the road from Mateur to Jefna and Sedjenane; (4) south-westward along the road from Mateur to Sidi Nsir and Béja; (5) against Medjez el Bab; (6) south-westward from Goubellat; (7) against Bou Arada; (8) in the area of Djebel Mansour; (9) in the Ousseltia valley. The first was made by Italian troops and the rest by Germans, von Arnim putting at least half his total strength into the field, some seventeen battalions and fifty tanks.

After two days' heavy fighting there were some gains and losses, but the enemy was held and suffered heavy losses in men and material. The only serious penetration was along the Mateur-Béja road, which von Arnim exploited with armour. A magnificent resistance was put up by British troops at Sidi Nsir, and Béja was saved.

Having failed to secure Béja the enemy turned against Oued Zarga, on the Béja-Medjez el Bab road, to cut communications, and at the same time increased his pressure on Sedjenane. Oued Zarga was held, but Sedjenane had to be evacuated. After a long struggle the enemy captured Djebel Dahra, near Djebel Abiod, on 21 March, thereby threatening Béja from the north. This was the extent of his gains: Béja, Medjez el Bab, and Bou Arada remained firmly in British hands, but the enemy had pressed uncomfortably close, especially to the Béja-Medjez el Bab road.

It was essential to the final attack on Tunis that the Medjez el Bab area should be cleared. Accordingly on 28 March the British 46th Division, a Parachute Brigade, and French Goums attacked from Djebel Abiod towards

Sedjenane, which was recaptured on 30 March. The 4th Division cleared the Béja-Mateur road almost to Sidi Nsir. Then on 7 April the 78th Division started a drive against the enemy in the heights north of Oued Zarga and cleared them to a depth of some 5 miles north of the Béja-Medjez el Bab road. On 14 April Djebel el Ang, north of Medjez el Bab, was taken. The stage in northern Tunisia was nearly ready for the final offensive. In the weeks since von Arnim's attack of 26 February the Eighth Army had overcome the Mareth position and entered el Hamma (26 February), forced the Wadi Akarit (5 April), met patrols of the advancing U.S. Army on the Gafsa-Gabès road (8 April), and occupied Sfax (10 April) and Sousse (12 April).

(iv) *The Mareth Position: Advance of the Eighth Army and the U.S. Second Corps*

Tripoli fell on 23 January. The port was extensively damaged and the entrance blocked: the nearest port was Benghazi, of limited capacity. Build-up in the Tripoli area was essential before a further offensive could be undertaken. Rommel hurried his troops to the Mareth position, followed by the 7th Armoured Division which maintained contact but was delayed by determined German rearguards, minefields, cratered roads, and sodden ground.

At Pisida on the Tunisian frontier the road was so thoroughly destroyed that a southward detour had to be made: the salt marshes were held by strong enemy detachments, and bad weather limited air support. A bridgehead was secured over the marshes by 8 February and the 7th Armoured Division pushed on to the approaches of Ben Gardane (15 February), and by 17 February Médenine and Fom Tatahouine were reached. Contact was then made with the Mareth position, but a considerable interval was inevitable before an attack could be mounted. The interval was used by Rommel to strengthen his position and to send much of his armour against Tébessa and the U.S. 2nd Corps (as described above).

The Mareth defences were held by the XXth and XXIst Italian Corps, the German 90th Light Division, and the 15th Panzer Division. On the right the Monts des Ksour as far as the Fom Tatahouine pass were held by the Italian Sahara Group and the German 164th Light Division with a Reconnaissance Unit. A small force was based on el Hamma to cover the Djebel Matmata-Djebel Melab-Djebel Tebaga gap, i.e. the flank and rear, against possible attack by General Leclerc's Fighting French advancing from the south.

The port of Tripoli was re-opened with astonishing speed, and the build-up there and in the forward areas was correspondingly rapid. Rommel decided to attack the Eighth Army. He left the Centauro Division in central Tunisia but recalled the 21st and part of the 10th Panzer Divisions to Mareth. The 15th and 21st Panzers took station at the western end of the main defences, the elements of the 10th went to the enemy's

right flank in the neighbourhood of the Ksar el Hallouf pass. The Eighth Army was at the time disposed as follows: the 51st Division with an Armoured Brigade in the coastal sector; the 7th Armoured Division astride the Mareth-Médénine road; the 2nd New Zealand Division with a Light Armoured Brigade and a Guards Brigade at Médénine, and patrols flanking the foothills.

On the evening of 4 March a diversionary attack was launched by infantry of the Young Fascist Division and some tanks against the New Zealanders on the Oued ez Zeuss, but was not pushed home. At dawn on 6 March the real attack was delivered against the 2nd New Zealand Division and the Guards on the British left flank. First, with artillery and air support, the detached battle group of the 10th Panzer Division advanced from Ksar el Hallouf and Toujane. Later the 15th and 21st Panzers and 90th Light Division attacked between the Gabès road and the foothills. Both attacks failed, as did four more in the afternoon. The enemy lost heavily in tanks (52) and in personnel; British armour was never engaged, and losses were extremely light. The enemy withdrawal was hammered by air attack. The 10th and 21st Panzers were sent to central Tunisia and the enemy reverted to passive defence. At the same time the enemy attacked the French patrols at Ksar Rhilane and lost eighteen armoured cars and seven guns to air bombing. Rommel's use of armour as a spearhead directed against or round an enemy's flank, without preliminary clearing of the ground by infantry, without much infantry support, and without proper reconnaissance, had failed disastrously, as it had at el Alamein: in earlier times, as in France in 1940 and in Africa, it had succeeded, but the development of the anti-tank gun now rendered such methods suicidal. Rommel handed over his command, now constituted as the 1st Italian Army, to General Messe, and left, a sick man, for Europe.

By mid-March the Eighth Army was reinforced by the 50th Division and the 4th Indian Infantry Division, with others also moving up. Meanwhile recovery from Rommel's thrust towards Tébéssa had also been rapid: the U.S. 1st Armoured Division had been re-equipped and was again ready for action. The U.S. 2nd Corps, now under Lieut.-General Patton, made an extensive advance, occupied Gafsa on 17 March, and split there: the 1st Armoured Division advanced along the road to Maknassy, the 1st Infantry Division took the road to el Guettar. Each of these forces had its own separate campaign.

The U.S. 1st Armoured Division opposed by the 21st Panzer Division and Italian troops occupied Maknassy on 22 March and advanced 5 miles beyond it. It was engaged all the next day and advanced slightly on 24 March: meanwhile at Maknassy large enemy forces, both tanks and infantry, were being held.

The U.S. 1st Infantry Division secured the western end of the Bou Hamran ridge and advanced through el Guettar, but was held up on Djebel Rouana: reinforced by the U.S. 9th Infantry Division, it attacked again,

but was held up throughout 21 March by elements of the Centauro Division, part of the 10th Panzers, and other German and Italian units on Djebel Chemsî and Djebel Berda astride the southern road to Gafsa. On 23 March the division was counter-attacked by tanks and infantry and suffered considerable losses of guns, but eventually the attack was repulsed with the loss of twenty tanks to the 10th Panzer Division.

Still farther south the French Algerian forces and Camel Corps advanced along the road between Djebel Berda and Djebel el Asker.

(v) *The Forcing of the Mareth Position*

On the night of 16 March a Brigade of Guards attacked and captured a stronghold on the upper part of the Oued ez Zeuss: they suffered heavily and could not be supported, but the attack served to mislead the enemy, whose deception was increased on the next day when the Allied Air Force started a violent attack on the enemy's lines.

On 21 March, however, the 2nd New Zealand Division, with a British Armoured Brigade's supporting troops, made a detour round Djebel Matmata, and advanced north to Djebel Tebaga and thence north-east towards el Hamma: the landing-grounds there and enemy positions on Djebel Tebaga were heavily bombed, and the bombing of the Mareth line continued. The main British attacks were launched during the night of 21 March. The New Zealand Division was up against a prepared position consisting of a Roman frontier wall spanning the gap between Djebel Tebaga and Djebel Melab, strengthened by anti-tank ditches and minefields. It was held by the Italian Sahara Group of the Pistoia Division with tanks in hull-down positions. After heavy fighting a breach was made and by midday on 23 March the left flank was only 10 miles from el Hamma, but el Hamma itself and Djebel Tebaga were still strongly held and enemy tanks were able to offer effective opposition.

On the Mareth line the attack was delivered on the coastal sector. The 50th Division crossed the Oued Zigzaou (which was waterlogged after a rain-storm) but was held up by an anti-tank ditch 24 feet deep covered by heavy machine-gun fire from strong points. After bitter fighting some of these were taken and a bridgehead established. The Young Fascist Division holding the line had been strongly reinforced by Grenadiers of the 15th Panzer Division, who counter-attacked violently, but the 50th Division, supported by the 50th Royal Tank Regiment, held on throughout 22 March while attempts were made to bridge the oued and the anti-tank ditch. During the night of 22 March the 51st Division advanced through the minefields but was held up by fire at the ditch, which by this time had been bridged. The bridgehead was attacked again and again by enemy tanks, and it was impossible to bring up support weapons. By first light on 23 March most of the troops had to be withdrawn. The 50th and 51st Divisions were shelled and counter-attacked throughout the day but held their ground. At nightfall the 50th Division was withdrawn. The 4th Indian

Division began to penetrate the *Monts des Ksour* and by the evening of the 25th had occupied *Ksar el Hallouf*. On the main *Mareth* line the Air Force was active.

Meanwhile in the *el Hamma* area aircraft ('tank busters') destroyed twenty-three enemy tanks; the 24th and 25th saw only patrol activity, but suddenly on the 26th a new phase opened with the arrival of the 1st Armoured Division to reinforce the New Zealand Division which that afternoon, having secured an important position on *Djebel Melab*, attacked along the *el Hamma* road and gained all objectives. The 1st Armoured Division then passed through the gap to the *Oued el Merteba*, and the enemy fell back with heavy losses in men and equipment. The attack was supported by twenty-two squadrons of the Western Desert Air Force.

The *Mareth* position was thus outflanked. The 90th and 164th German Divisions and all remaining armour were sent to the *el Hamma* area to reinforce the 21st Panzers and the large force of German and Italian infantry already engaged there. In spite of very heavy fighting the advance went on, and by midday on 22 March Italians were surrendering in large numbers and the remaining Germans were clinging to *el Hamma* and the *oueds* near it.

On that day also the 4th Indian Division was pressing down on *Toujane*, to which also the 7th Armoured Division with an Infantry Brigade was advancing. By last light on 28 March the 50th Division was in *Mareth*, the 51st Division was 2 miles beyond the *Zarat-Mareth* road, and *Toujane* was occupied. That night the enemy evacuated *el Hamma*, and *Gabès* fell next day. Only enemy detachments remained on the shores of the *Chott Djerid*, and with them the French camel troops dealt effectively.

(vi) *The Forcing of the Wadi Akarit, and Pursuit*

General Messe decided to make a stand along the *Wadi Akarit* (*Oued el Akarit*), a naturally strong position: there was no time to prepare defences or mine the approaches. It was held by the infantry and the remaining armour was posted well in the rear, partly to refit and partly to guard the right flank against the U.S. 2nd Corps, which in fact attempted an attack on 30 March: the tanks were, however, held up by minefields and by tank opposition and no progress was achieved.

The Eighth Army quickly took up battle positions and reconnoitred. On the night of 5 April the Gurkha Rifles seized *Djebel Beida* and took a large number of prisoners. In the early hours of 6 April, after a short barrage, the general attack was launched. The 51st Division was on the right, the 50th in the centre, and the 4th Indian Division on the left. By the afternoon of 6 April *Djebels Roumana* and *Fatnassa* had been stormed; counter-attacks by German tanks and infantry against the 50th Division and the 4th Indian Division had failed. During the night the enemy withdrew northward, harassed by armour and leaving much booty. At the same time he began to pull in his forces at *Maknassy* and *el Guettar*, and the

rearguards suffered heavily from the U.S. 1st Armoured Division. On 8 April American patrols from el Guettar made contact with Eighth Army patrols on the Gabès road.

Maharès was entered on 9 April and Sfax on the 10th. The 7th Armoured Division and the 51st Division moved up the coast road, and the 1st Armoured Division was directed on Kairouan. The Îles Kerkenna were occupied by a detachment from Malta.

In this rapid movement the U.S. 2nd Corps was left behind and Allied forces at Fondouk took a hand. The U.S. 34th Division had reached Fondouk at the end of March, but had been unable to make further progress. On 9 April the British 6th Armoured Division forced the Fondouk pass: the road was mined and the hills on either side held by the enemy, who thus prevented the infantry from clearing the minefield. Tanks accordingly drove over the minefield to clear a path, twenty being lost: the remainder then passed through the gap. The U.S. 34th Division cleared the hills: the 6th Armoured Division, with French troops, extended the clearing of high ground and then pushed on, fought a successful tank battle near Kairouan, by-passed the town, and reached Sbikha on 11 April. At about the same time the British 1st Armoured Division pushing up from the south seized the great airfield of la Fauconnerie on the Sfax-Faid road. Next day the Eighth Army occupied Sousse without opposition.

(vii) *The Main Offensive*

In three weeks General Messe had lost about 30,000 prisoners and probably half as many killed and wounded, the greater part of his armour and a very large number of guns, all the stores in the dumps in the south, and a large part of his transport. He had also lost many airfields, and his air force had suffered extremely heavily: the Allies had attained air superiority. Axis supply ships were being sunk in large numbers on the passage to and from Tunisia and in four days nearly 100 carrier aircraft, a type hitherto practically immune, had been shot down.

Nevertheless Messe had achieved his purpose of effecting a junction with von Arnim's army and there was no intention of evacuating the country: reinforcements of men and material continued to arrive. The plan was to deny the Allies the Mediterranean passage and postpone their attack against the mainland of Europe for as long as possible.

Von Arnim now assumed supreme command as G.O.C.-in-C. 'African Army Group'. A defensive position had been prepared from Enfidaville to Pont du Fahs and so north across the hills to Kef Abbed on the northern coast of Tunisia.

By the middle of April the opposing forces were confronting one another along a line of about 110 miles. The Allies' dispositions were as follows. On the right was the Eighth Army from the sea to a point 25 miles inland. On its left came the French 19th Corps covering a front of about 25 miles in the high ground on each side of the Oued el Kebir. Then the First Army,

to which the British 1st Armoured Division had been transferred from the Eighth Army, extended for about 30 miles, from Bou Arada to the heights above Medjez el Bab. The remaining 30 miles were taken over by the U.S. 2nd Corps, now under Major-General Omar Bradley, relieving Lieut.-General Patton, who had been assigned to the command of the U.S. 7th Army in preparation for the invasion of Sicily. On the extreme left of the line, on the coast, were French units of the Corps Franc d'Afrique and Goums.

The U.S. 2nd Corps (U.S. 1st Armoured Division and U.S. 1st, 9th, and 34th Divisions) had moved from southern Tunisia, a march of over 200 miles across the lines of communication of the First Army. Air superiority had prevented the enemy seeing this remarkable move, and in due course he was surprised.

The enemy's dispositions were as follows. On his left, north of Enfidaville, a belt of steep heights extended inland to the region of Pont du Fahs, and was occupied by the 1st Italian Army (including the Afrika Corps) composed of the German 15th and 21st Panzer Divisions, 90th and 164th Light Division, the Italian Centauro (Armoured) Division with the remains of the Trieste, Pistoia, and Young Fascist Infantry Divisions, and some detached units. In the centre of the enemy line, from Pont du Fahs to the Oued Medjerda, were (from south to north) the Italian Superga Division, the German 10th Panzer Division, the Hermann Göring Infantry Division, and part of the 334th Infantry Division, with a Heavy Tank Battalion, all belonging to the 5th Panzer Army. The remainder of the 5th Panzer Army, consisting of the rest of the German 334th Infantry Division, the 999th Infantry Division, the Manteufel Group, and some Italian Bersaglieri and Marines, lay in the broken hilly country south and west of Bizerta, together with some scratch 'Marsch' battalions. Two German Anti-Aircraft Divisions were stationed at Tunis and Bizerta.

General Alexander's plan was to attack with the Eighth Army and, if rapid progress could not be made, to use it to pin down the enemy in the Enfidaville region and attack in the centre with the First Army. This is, in fact, what occurred.

On the evening of 19 April an attack was launched by the 50th Division on the coastal area of Enfidaville: next morning the town was occupied and patrols pushed forward. North-west of Enfidaville the 2nd New Zealand Division and an Armoured Brigade advanced in the area of Takrouna in face of heavy fire, and, after a bitter struggle, cleared the high ground of Takrouna next day and held it against counter attacks.

The 4th Indian Division, with some armour and the Fighting French, advanced in the region of Djebel Garci, 8 miles west of Enfidaville. Farther west again were other British units. By the end of 20 April all gains had been held, and counter-attacks repulsed.

Meanwhile, on the night of 20-21 April, the enemy, knowing that a large armoured force had been concentrated, launched a spoiling attack against

Medjez el Bab and Bou Arada. Five infantry battalions and sixty to eighty tanks were used. After confused fighting all positions were held by the British 1st Division and the enemy was repulsed with the loss of about half his tanks. No dispositions were spoilt, and on 22 April the 1st Army started an offensive eastward from the Bou Arada-Goubellat road. Good progress was made that day and on the next day by the 46th Division and the 6th Armoured Division. A successful attack was also launched east of Medjez el Bab by the 1st Division, and north of the town the 78th Division secured 'Longstop Hill' (Djebel el Ahmera). Enemy resistance everywhere was determined and costly to the British troops.

Meanwhile, in the Sidi Nsir and Sedjenane sectors, the U.S. 2nd Corps came into action for the first time since their remarkable move from the el Guettar-Maknassy area and gained all their objectives. On the north coast the French Goums advanced some 10 miles east from Cap Serrat.

On 24 and 25 April bitter fighting continued from end to end of the northern and central sectors of the front, and Allied positions were improved; on the 26th and 27th considerable local progress was made in spite of enemy counter-attacks which achieved some success. The progress included the occupation by the French 19th Corps of Djebel Mansour and their advance on Djebel Fkirine and in the direction of Pont du Fahs, where they debouched on the plain 3 miles from the town. On 27 April they cut the road leading south-east from Pont du Fahs to Enfidaville. On the night of 28-29 April the 46th Division on their right secured the western slopes of Djebel bou Kournine, the fortified feature immediately north of Pont du Fahs which was von Arnim's main bulwark at the southern end of the central sector. It seemed that the way was open for the 1st Armoured Division, but the advance was blocked by a screen of anti-tank guns.

The days of 29 and 30 April were marked by confused and costly actions in the central sector east of Medjez el Bab: the enemy launched counter-attacks supported by as many as forty tanks drawn from the 15th Panzer Division, which had been moved from the southern sector. In general the attacks were held: casualties were heavy on both sides.

In the northern sector the American and French troops pushed steadily on, the U.S. 34th and 1st Divisions achieving notable successes in the country east of Sidi Nsir.

During the whole period of the battle from 21 April onwards the Allied Air Forces were very active and by the end of the month had established complete air superiority over the battlefield: enemy troops on the road, stores in bases like Tunis and Bizerta, shipping, transport planes, and bases in Sicily, Sardinia, and Sicily were also heavily attacked.

By the end of April it was clear that the enemy was determined to hold on to the hills dominating Enfidaville, his strongest position, and in the central sector he still held the high ground which denied the Allies the use of their armour. His withdrawal in the northern and coastal sectors would stiffen the defence of his centre. On 30 April General Alexander ordered

the 7th Armoured Division and the 4th Indian Division, both of which had been in north Africa since 1940, to move from the Eighth Army front to Medjez el Bab, where they came under the First Army.

In the north French and American troops pushed along the coast to a point 16 miles east of Cap Serrat. The enemy was forced to retreat from his advanced position, and on 3 May came the first break-through. The U.S. 1st Armoured Division, advancing from the direction of Sidi Nsir, entered Mateur, the vital road centre of the north on the Bizerta-Tunis railway. Other American troops advanced past Jefna, and farther north occupied the high ground of Kef en Nsour. The French reached the northern shore of the Garaet Achkel.

On 4 May there was heavy fighting in the central sector, where the enemy brought up armour from reserve and put in an attack, which was repulsed with loss. Next day Djebel bou Aoukaz was taken by the British 1st Division, thereby depriving the enemy of his last strong position on the right of his central sector. The road to Tunis was now open and the stage set for the final assault.

(viii) *The Final Assault*

In view of the progress of the battle, von Arnim had to make a new plan: his orders were to prolong resistance as long as possible and he could do so only by shortening his line. There was no thought of evacuation, and in any event such a manoeuvre was now impossible; special personnel could be flown out by transport planes, but of these the Allied Air Forces were taking heavy toll. Shortening the line involved the evacuation of Bizerta and Tunis and the withdrawal of the enemy forces in those regions by the excellent roads crossing the plains around Tunis to Hammam Lif. The final stand was to be made on a new perimeter running from Hammam Lif through Crétéville and Zaghouan and then along the original line of the Enfidaville range. Behind this line lay the Cap Bon peninsula, to which von Arnim had been transferring great dumps of supplies and ammunition, sufficient for perhaps two months: they might even be replenished from overseas by means of the jetties that had been built at Kelibia.

The enemy was not allowed to carry out the plan: in the first place, he was unaware of the presence of three, instead of two, British armoured divisions on the Medjez el Bab-Goubellat front; in the second, he was not prepared for the tactics employed in the use of those divisions, namely their advance without regard to their flanks to break up the manoeuvres of the infantry opposed to them. The weight and speed of the attack overwhelmed him.

The First Army, after intense artillery preparation, launched its attack from the area immediately east of Medjez el Bab in the early hours of 6 May, and before midday the 4th British Division on the right and the 4th Indian Division on the left had taken their first objectives at Bordj Frendj: opposition was slight. The 6th Armoured Division on the right and the 7th

Armoured Division on the left were then passed through and drove astride the Tunis road. A tank battle developed south of Furna and the enemy were driven off to the south-east by the 6th Armoured Division: infantry were brought up to cover the exposed right flank. Resistance stiffened, but in the afternoon the 7th Armoured Division captured Massicault. In the evening another tank battle was fought north of Massicault and the enemy, who had twenty tanks of the 15th Panzer Division, was driven away to the north-east. The Allied Air Forces provided complete support and had overwhelming domination of the air.

Farther north the U.S. 2nd Corps continued their progress. While their 34th Infantry Division moved in the direction of Tebourba, their 1st Infantry Division engaged the enemy along the line of the Oued Tine, south of Mateur. After fighting heavily all day, their 1st Armoured Division, operating north-east from Mateur, took the high ground commanding the road to Ferryville. Their 9th Infantry Division, operating north of the Garaet Achkel, approached within 9 miles of Bizerta.

Next day (7 May) the U.S. 1st Infantry Division forced a crossing of the Oued Tine, south-east of Mateur, and the 1st Armoured Division occupied Ferryville: then the 9th Infantry Division, advancing on the north of the Garaet Achkel, broke down all remaining resistance and in the afternoon swept into Bizerta. Thus the U.S. 2nd Corps completed an operation of great difficulty.

On the morning of 7 May to the north of the Massicault-Tunis road the 7th Armoured Division took St. Cyprien and the advance continued on le Bardo. In the afternoon, after severe fighting in the suburbs, Tunis was entered and occupied. The 6th Armoured Division reduced a strong-point at la Mornaghia and the high ground to the south was occupied by infantry. Farther south the enemy withdrew from the region north of the Sebkret el Kourzia and the British 1st Armoured Division reached the region of Bir Mcherga, on the main Pont du Fahs-Tunis road. On the same day, moreover, the French 19th Corps took Pont du Fahs and some high ground to the east of the town.

In a single day, therefore, Tunis and Bizerta fell, and movements were in train to prevent the manning of a last resistance in the Zaghouan-Enfidaville-Cap Bon fortress.

(ix) *The Destruction of the Axis Armies*

It has already been stated that von Arnim had foreseen the loss of Bizerta and Tunis and that he had planned that the forces in these areas should retire across the plains of Tunis to Hammam Lif.

In the event, the occupation of Bizerta by the U.S. 2nd Army was the signal for the enemy troops in that area and to the south of it to implement the plan. But the British 7th and 6th Armoured Divisions had on the same day broken out across the plains and entered Tunis, surprising the enemy there and cutting the roads from the north to Hammam Lif. Moreover,

the 7th Armoured Division immediately turned northward along the coastal road to Bizerta to meet the enemy, and, within a few hours, the British 1st Division was in Djedeida, the enemy's withdrawal being thus effectively blocked. The destruction of these troops was ensured, because the U.S. 34th and 1st Divisions were pressing in from the west, and elements of the U.S. 1st Armoured Division was moving from Mateur towards the southern side of the Lac de Bizerte.

On 9 May all enemy forces in the area surrendered unconditionally with their commanders and staff: they included the Manteufel Group, the German 334th Infantry Division and the 15th Panzer Division, a company of the 504th Heavy Tank Battalion, and the 20th Anti-Aircraft Division. On the same day the British 1st Armoured Division captured Crétéville and pushed on eastward.

The British 6th Armoured Division swung southward out of Tunis and along the coast road to Hammam Lif and the base of the Cap Bon peninsula. The high ground above Hammam Lif, part of the line on which the enemy intended to make his final stand, was taken. On 10 May the 6th Armoured Division occupied Soliman and Menzel bou Zelfa in the Cap Bon peninsula, and by evening advanced elements had reached Hammamet, thereby separating the enemy forces in the area of Zaghouan from those which had retreated into Cap Bon and from their reserves of ammunition, petrol, and food.

On 11 May the 6th Armoured Division continued its advance through Hammamet, and, fanning out north and south along the coast, reached Nabeul and Bou Fichta respectively. Meanwhile the infantry of the British 4th Division relieved the armour at Menzel bou Zelfa, and, dividing, sent patrols along the north coast which linked up with others that had gone along the south coast. They met little opposition, and the peninsula was secured with all the stores accumulated there by the enemy in preparation for a siege.

The enemy forces were now disposed as follows: between Enfidaville and Bou Fichta were the German 90th Light Division; in the Zaghouan-Saouaf area, the German 164th Division; west of Bou Fichta, the Italian Superga Division and remnants of the Italian Panzer Army; between Grombalia and Ste. Marie du Zit, remnants of the German 10th and 21st Panzer Divisions (the latter without tanks) and of the 501st Heavy Tank Battalion. All these were completely enclosed between the Eighth and the First Armies.

East of Grombalia, at the base of the Cap Bon peninsula, were the remnants of the German 19th Anti-Aircraft Division and of the Hermann Göring Division, with a few tanks. These were enclosed between the British armour which had reached Hammamet, the British armour in the area of Grombalia, and the British infantry in the area of Menzel bou Zelfa.

On the evening of 11 May 22,000 of the enemy troops of the Pfeiffer Group, consisting of the Italian Superga Division and the battle group of

the German 21st Panzer Division, facing the Division du Maroc of the French 19th Corps surrendered unconditionally to General Mathinet. Thus ended all opposition from Saouaf to north of Zaghouan.

During the morning of 12 May the enemy in front of the Eighth Army resisted stubbornly and counter-attacked the Fighting French 1st Division. The 6th Armoured Division linked up with the Eighth Army in the coastal sector, and in the afternoon a bombing attack on the enemy encircled in the region of Enfidaville induced the Italian 1st Army to ask for terms of surrender. On that day also von Arnim was taken prisoner near Ste. Marie du Zit by the 4th Indian Division, which had advanced from the west. On 13 May Messe, promoted Marshal, surrendered unconditionally with the remainder of the Axis forces.

Since 5 May 248,000 prisoners had been taken. In addition the enemy had lost in Tunisia alone since the start of the campaign 50,000 dead and 43,000 prisoners. Only 638 escaped, mostly by air: the in-shore blockade by light forces of the Royal Navy made escape by sea impossible. The battle of Tunisia had thus cost the enemy 340,000 men and the whole of their equipment and stores. Between 8 November 1942 and 7 May 1943, 1,696 enemy aircraft were destroyed in combat or by anti-aircraft fire for the loss of 657 Allied aircraft. After the enemy's collapse 633 aircraft were found on the ground. The Royal Navy destroyed 47 enemy ships by submarine and 42 by surface craft between the start of operations in north Africa and the end of April: in addition 95 enemy ships were sunk by air attack.

APPENDIX E

NOTE ON CUSTOMS AND MANNERS

THE following notes on conditions of life, as they affect the non-Moslem foreigner, apply especially to the country and the oases, where tradition is strong and the foreigner may be treated with reserve.

The flat roofs of native houses are reserved primarily for women of the household: the master of the house may go there if he desires, but visitors will not be taken there unless the women have first been removed. Intrusion will certainly lead to trouble.

A Moslem's house is his castle: strangers will be received in a certain quarter of it, but they will get no farther: if they are escorted to an inner court the women will first be well concealed: they are likely to watch proceedings through lattices and screens, and may be heard to discuss the visitor. A well-meaning visitor will cause umbrage to his host if he takes notice of the presence of the women: it is not politic to do so, nor to inquire after their health. These rules apply equally to the tents of nomads. No stranger will enter the women's quarters under any circumstances. It is a good rule never to speak to a native woman anywhere. Women visitors may be invited to enter the female quarters of a house, and should accept the hospitality.

In spite of the extreme views on the seclusion and protection of women held by Moslems, it must not be assumed that women are necessarily held in high regard or affection. Polygamy is much less common than it was, but divorce is simple and not unusual. Unmarried adult daughters are a stigma; marriageable daughters are a financial asset.

European women who go about scantily clad, apeing men in shirts and shorts, and so on, earn the contempt and disgust of Moslem manhood. Moslems do not, in fact, appreciate the wearing of shorts by men, but accept it as a European or military custom. Natives will often finger European clothing out of sheer interest in its quality.

It is not the custom to call on a native of good family and position without due warning. A messenger, servant, or letter should be sent as long as convenient before the time chosen for the visit, and a reply, usually by a member of the household or a trusted servant, may be expected: this messenger may act as a guide at the appointed time. In country districts and in the oases it is likely that a party may ride out to meet a visitor to whom high honour is considered to be due.

Meetings and leave-takings are accompanied by dignified ceremonial to which strict attention must be paid: grave insult may be given by Europeans who fail to observe the custom. A courtesy visit must in no circumstances be hurried: the native is not in a hurry.

It is well to find out—with due discretion—on what scale the native of distinction expects to receive or intends to show hospitality: customs are well known among the people. If time is no object and the native hospitable, he will give, and expect, a formidable meal, chickens, sheep, and the like being slaughtered for the purpose. Celebration of this sort, in which considerable numbers may take part, may assume astonishing proportions. The native can eat enormous quantities of food on such occasions, and he regards as impolite or second-rate the European who does not do likewise.

As an alternative to this feast a European may be invited to a meal in a native house: his host may withdraw during the meal, the European's servant then waiting upon his master, not infrequently taking his own cutlery, plates, &c., for the purpose.

Alternatively tea or coffee may be taken in company with considerable ceremony. It is frequently sufficient for the European, especially if he is on a journey, to invite his host or visitor to take tea or coffee with him in his camp: a gift—sugar, tea, or some personal possession according to the status of the parties concerned—will usually be acceptable: it should be presented with due dignity.

Old men are much respected by the young and have much influence: Europeans should show them marked courtesy.

It should be remembered that nomads and most rural people in north Africa, even if half starved and dressed in rags, are proud, independent, and virile, and resent bullying or undignified treatment: if these virtues are appreciated and respected by Europeans, relations should be harmonious and advantageous. There are, nevertheless, groups which, through long misfortune, poverty, disaster, or natural inclination, are outcasts, thieves, or dissidents: they are well known in their own districts and due precaution must be taken in dealing with them.

Holy places of all types are to be found throughout Tunisia: some are Moslem, others are of far more ancient origin. They may be marked by trees, rings of stones, flags, or rags tied to sticks or trees: they may be unmarked, but will be well known to local guides. These places are best avoided: many of them are associated with saints and spirits, and meddling with them may cause grave disquiet, which is likely to be associated with the evil eye or ill-fortune in one of many forms.

The interiors of the mosques in Kairouan are open to non-Moslem visitors under certain conditions: elsewhere entry is forbidden. Native cemeteries and places of worship should be avoided by all Europeans and foreigners associated with them, especially during feasts, fasts, and gatherings, when religious and racial feelings may run high.

Photography of any of the above, and frequently of men, women, and children, should only be allowed after consulting local opinion: it is also associated with the evil eye. The use of optical instruments, including surveying equipment, may give rise to native suspicion. In the towns and

in districts where there has been long association with Europeans, most of the rules suggested above may be relaxed in some degree.

Throughout Africa the native attitude to animals differs greatly in certain respects from that which is the code of most Anglo-Saxons. Native owners take a pride in well-bred or pedigree stock, whether horses, camels, cattle, or sheep: they value them as possessions, as visible wealth, and therefore take considerable trouble to maintain their condition and to dress wounds, though the treatment may be painful and seem cruel. The native rarely considers the question of inflicting or relieving pain, and will cause pain as a means to an end: he will prick on or flog an animal until it dies, but he is totally unconscious of any wrong-doing. Left to himself he treats his own kind in the same way. Indignant Europeans, unused to cruelty to animals, may try to intervene and be mixed up in brawls, the results of which may be serious: direct action of this sort does little good and sometimes much harm, and, in any case, is not understood by the natives. The only effective prevention of the ill-treatment of animals is the long-term policy of teaching the natives that kindness reaps its own reward, a policy which, though it often seems doomed to failure, has met with surprising success in some parts of Africa. It must be remembered that African standards are not those of the Anglo-Saxon of the twentieth century: the assortment of blind, diseased, and verminous children and beggars outside any mosque illustrates an attitude of mind rather than a social ill.

To the Moslem the pig is unclean, and so he does not rear it or keep it in his house or tent as he keeps his savage, half-wild dogs or his pure-bred hounds: but to call him a dog, or the son of a dog, is an insult that may easily end in trouble. Such apparent inconsistencies are firmly established in most creeds and races. Finally it should be remembered that to the less sophisticated of the people of Tunisia many European practices are as inexplicable or as distasteful as some of their own may be to Europeans.

APPENDIX G

ADMINISTRATIVE DIVISIONS AND COMMUNES

TABLE I. Administrative Divisions.

TABLE II. Communes at 31 December 1936.

TABLE I. *Administrative Divisions*

<i>Regions</i>	<i>Regions: Headquarters</i>	<i>Civil Controls</i>	<i>Civil Controls: Headquarters</i>	<i>Caidats</i>	<i>Caidats: Headquarters</i>
Bizerta	Bizerta	Béja Bizerta	Béja Bizerta	Béja Bizerta Mateur	Béja Bizerta Mateur
		Tabarka Souk el Arba	Tabarka Souk el Arba	Ain Draham Souk el Arba Souk el Khemis	Ain Draham Souk el Arba Souk el Khemis
Tunis	Tunis	Tunis	Tunis	Tunis-Ville Banlieue de Tunis	Tunis Tunis
		Zaghouan Grombalia	Zaghouan Grombalia	Zaghouan Nabeul Soliman	Zaghouan Nabeul Soliman
Le Kef	Le Kef	Teboursouk Le Kef	Teboursouk Le Kef	Teboursouk Le Kef	Teboursouk Le Kef
		Maktar	Maktar	Tadjerouine Ouled Ayar Ouled Aoun	Tadjerouine Maktar Silia
Sousse	Sousse	Medjez el Bab Sousse	Medjez el Bab Sousse	Medjez el Bab Sousse Monastir Mahdia Souassi	Medjez el Bab Sousse Monastir Mahdia La Smala des Souassi
		Kairouan	Kairouan	Kairouan Zlass	Kairouan Pichon
		Thala	Thala	Fraichiches Madjeurs	Féria
Sfax	Sfax	Sfax	Sfax	Sfax Djebianina La Skhirra	Sfax Djebianina La Skhirra
		Gabès Gafsa	Gabès Gafsa	Arad Gafsa Hammama	Gabès Gafsa Sidi bou Zid
		Tozeur Djerba	Tozeur Houmt Souk	Djerid Djerba	Tozeur Houmt Souk

TERRITOIRES MILITAIRES DU SUD

<i>Headquarters</i>	<i>Caidats</i>	<i>Caidats: Headquarters</i>
Médenine	Ouerghemma Matmata Tatahouine Nefzaoua	Médenine Matmata Foum Tatahouine Kebili

TABLE II. *Communes at 31 December 1936*

Regions	Civil Controls	Communes	Date of creation	
Bizerta	Béja	Béja	1887	
	Bizerta	Bizerta ¹	1884	
		Ferryville	1905	
		Mateur	1898	
	Tabarka	Ain Draham	1892	
Tunis	Tabarka	Tabarka	1892	
	Souk el Arba	Souk el Arba	1887	
		Ghardimaou	1905	
	Tunis	Souk el Khemis	1905	
		Ariana	1908	
		Le Bardo	1909	
		Carthage	1910	
		La Goulette ²	1884	
		Hammam Lif	1899	
		La Marsa	1912	
		Maxula-Radès	1899	
		St. Germain	1909	
		Sidi bou Said	1893	
		Tebourba	1890	
		Tunis	1858	
		Syndicat des communes de la Banlieue Nord de Tunis		..
		Zaghouan	Zaghouan	1890
		Grombalia	Grombalia	1921
	Menzel bou Zelfa		1921	
Le Kef	Menzel Temime	1921		
	Nabeul	1887		
	Soliman	1921		
	Teboursouk	Le Krib	1920	
		Teboursouk	1904	
	Le Kef	Le Kef	1884	
		Ebba Ksour	1921	
	Sousse	Medjez el Bab	1892	
		Sousse	El Djem	1922
			Djemmal	1921
			Kalaa Kebira	1921
			Ksour Essaf	1922
			Mahdia	1887
			Msaken	1921
			Moknine	1921
Monastir			1887	
Sousse			1884	
Kairouan			Hadjeb el Aioun	1922
Thala			Kairouan	1887
			Fériana	1920
Sfax			Thala	1904
			Sbeitla	1927
	Maharès	Maharès	1921	
		Sfax	1884	
	Gabès	Gabès	1887	
		El Hamma de l'Arad	1920	
	Gafsa	Gafsa	1890	
	Philippe-Thomas	Philippe-Thomas	1908	
		Tozeur	1888	
	Djerba	Nefta	1919	
		Djerba (formerly Houmt Souk)	1887	
		Ben Gardane	1906	
	Territoires militaires du Sud	Tatahouine	1920	
		Médenine	1913	
		Zarzis	1889	

¹ Including la Pêcherie since 1928.² Including le Kram since 1926.

APPENDIX H

AGRICULTURAL STATISTICS

- Table I. Area and Production of Cereal Crops, 1929-1938.
- „ II. Area and Production of some Non-Cereal and Fruit Crops, 1929-1938.
- „ III. Number of Olive-trees by Caidats, 1937.
- „ IV. Number of Livestock, 1928-1937.
- „ V. Distribution of Livestock by Caidats, 1937.

Note. Figures in some of these tables are given to the nearest thousand: more precise figures will sometimes be found in the text of Chapter XII.

TABLE I. *Area and Production of Cereal Crops, 1929-1938*

Year	Hard wheat		Soft wheat		Barley		Oats		Maize and sorgho	
	Area sown (hectares)	Production (tons)	Area sown (hectares)	Production (tons)	Area sown (hectares)	Production (tons)	Area sown (hectares)	Production (tons)	Area sown (hectares)	Production (tons)
1929	637,000	265,000	64,000	70,000	505,000	250,000	54,000	50,000	20,000	6,500
1930	708,000	203,000	70,000	80,000	487,000	120,000	50,000	30,000	15,000	6,000
1931	720,000	270,000	80,000	110,000	495,000	180,000	29,000	33,000	18,000	5,000
1932	858,000	340,000	110,000	135,000	610,000	340,000	21,000	28,000	18,000	5,500
1933	600,000	170,000	110,000	80,000	375,000	160,000	21,000	10,000	15,000	6,000
1934	668,000	200,000	120,000	175,000	480,000	150,000	35,000	20,000	25,000	7,000
1935	680,000	300,000	140,000	160,000	550,000	310,000	25,000	18,000	17,000	6,000
1936	360,000	120,000	134,000	100,000	300,000	75,000	25,000	10,000	18,000	3,500
1937	830,000	280,000	153,000	200,000	620,000	200,000	37,000	28,500	27,000	6,000
1938	514,000	200,000	161,000	180,000	300,000	100,000	40,000	30,000	17,000	5,000

TABLE II. Area and Production of some Non-Cereal and Fruit Crops, 1929-1938

Year	Tobacco		Linseed		Potatoes		Olives		Vines		
	Area (hectares)	Production (tons)	Area (hectares)	Production (tons)	Area (hectares)	Production (tons)	Total No. of trees	Trees in bearing (15 years old and over)	Total area (hectares)	Area in bearing (hectares)	Production of wine (hectolitres)
1929	425	420	2,328	1,200	2,000	8,000	16,368,150	11,479,947	35,231	30,768	1,078,752
1930	425	420	2,190	1,000	2,000	7,000	16,369,600	11,473,642	39,850	35,231	1,000,000
1931	676	742	3,000	1,200	2,000	5,000	..	..	48,100	44,000	712,000
1932	524	618	2,250	1,100	2,000	6,000	..	..	53,500	48,000	1,710,000
1933	392	511	500	300	2,000	6,000	17,122,604	12,609,764	54,500	48,000	1,420,000
1934	500	650	500	250	2,000	5,000	16,738,604	12,307,963	55,000	48,000	1,700,000
1935	436	595	350	200	2,200	6,500	17,144,000	12,637,000	49,000	49,000	1,700,000
1936	443	700	300	100	2,000	6,000	17,150,000	12,307,000	47,000	47,000	1,420,000
1937	394	600	425	100	2,500	10,000	17,366,000	13,282,000	47,000	47,000	1,454,000
1938	330	400	210	100	3,000	5,500	17,766,000	13,283,000	46,000	40,000	1,970,000

Year	Dates						Oranges		Lemons		Almonds	
	Deglet-nour			Other varieties			Area (hectares)	Production (tons)	Area (hectares)	Production (tons)	No. of trees	Production (tons)
	Total No. of trees	Trees 20 years old and over	Production (tons)	Total No. of trees	Trees 20 years old and over	Production (tons)						
1929	183,203	69,679	1,950	2,421,788	1,138,003	36,000	423	700	300	800	677,000	1,850
1930	183,211	79,180	800	2,422,953	1,248,040	24,000	..	2,800	..	500	677,000	2,000
1931	..	..	..	..	..	..	330	5,000	300	900	..	..
1932	..	..	..	..	..	..	330	3,500	300	600	..	..
1933	190,400	79,250	3,000	2,486,600	1,285,300	26,000	No. of trees		No. of trees		No. of trees	
1934	190,400	79,250	500	2,486,600	1,285,300	6,000	85,000	2,500	52,000	600	700,000	2,000
1935	193,000	79,000	3,000	2,482,000	1,285,000	36,000	85,000	2,200	52,000	800	700,000	2,000
1936	190,000	79,000	500	2,487,000	1,293,000	7,000	120,000	7,500	52,000	600	700,000	2,200
1937	194,000	92,000	4,000	2,481,000	1,414,000	28,000	170,000	8,500	50,000	1,400	700,000	2,000
1938	..	..	..	..	..	..	..	..	..	2,000	800,000	4,000

TABLE III. *Number of Olive-trees by Caidats, 1937-1938*

Region	Civil Control	Caidat	Unproductive	Not bearing	Bearing	Total
Bizerta	Béja	Béja	1,345	2,648	13,629	17,622
	Bizerta	{ Bizerta	14,191	24,791	437,050	476,032
		{ Mateur	100,245	37,302	28,486	166,033
	Tabarka	{ Ain Draham	1,300	16,093	2,894	20,347
	Souk el Arba	{ Souk el Arba	42,633	62,858	34,462	139,953
		{ Souk el Khemis	1,339	24,281	6,551	32,171
Tunis	Tunis	Banlieue de Tunis	50,428	68,516	843,826	962,770
	Zaghouan	{ Zaghouan	7,169	62,575	86,485	156,229
		{ Nabeul	8,465	114,843	462,470	585,778
	Grombalia	{ Soliman	72,283	43,936	1,151,284	1,267,503
Le Kef	Teboursouk	Teboursouk	5,010	37,176	56,139	98,325
	Le Kef	{ Le Kef	24,497	10,441	30,544	65,482
		{ Tadjerouine	861	3,897	1,663	6,421
	Maktar	{ Ouled Ayar	8,598	5,376	36,988	50,962
		{ Ouled Aoun	20,648	6,959	28,394	56,001
	Medjez el Bab	Medjez el Bab	5,234	27,560	47,238	80,032
Sousse	Sousse	{ Sousse	56,390	458,533	1,697,415	2,212,338
		{ Monastir	40,851	611,231	1,914,124	2,566,206
		{ Mahdia	59,099	344,426	1,275,157	1,678,682
	Kairouan	{ Souassi	938	182,195	187,579	370,712
		{ Kairouan	9,313	190,982	49,354	249,649
		{ Zlass	120,653	73,715	119,464	313,832
	Thala	{ Fraichiches	196	7,967	2,035	10,198
	{ Madjeurs	701	48,718	15,656	65,075	
Sfax	Sfax	{ Sfax	24,561	441,889	1,790,918	2,257,368
		{ Djebianiana	30,208	342,864	882,295	1,255,367
		{ La Skhirra	1,553	508,824	297,726	808,103
	Gabès	{ Arad	1,318	42,193	96,785	140,296
	Gafsa	{ Gafsa	3,100	46,993	153,373	203,466
		{ Hammama	684	153,415	17,172	171,271
	Tozeur	{ Djerid	1,541	10,116	26,248	37,905
Djerba	{ Djerba	52,549	36,126	310,827	399,502	
Territoires militaires du Sud		{ Ouerghemma	6,789	291,648	274,805	573,242
		{ Matmata	3,920	40,968	115,517	160,405
		{ Tatahouine	2,617	18,289	54,172	75,078
		{ Nefzaoua	322	17,364	17,817	35,503
TOTAL			781,609	4,417,708	12,566,542	17,765,859

TABLE IV. *Number of Livestock, 1928-1937*

Year	Sheep	Goats	Cattle	Horses	Mules	Asses	Camels	Pigs
1928	2,172,820	1,390,131	484,120	88,190	40,243	159,430	151,768	12,785
1929	2,460,714	1,664,926	498,144	88,632	40,892	161,190	155,842	12,728
1930	2,975,514	2,004,692	502,419	95,083	43,683	180,153	164,038	16,661
1931	2,474,855	1,403,900	539,638	99,273	47,119	182,325	162,031	25,156
1932	2,931,041	1,668,469	542,878	102,932	50,692	186,604	169,485	23,814
1933	3,076,027	1,835,556	543,534	105,651	52,470	191,911	179,378	21,188
1934	3,375,170	1,797,252	486,853	102,272	53,896	170,936	176,589	21,992
1935	3,209,981	1,815,381	441,161	101,945	53,290	163,020	167,368	26,510
1936	3,532,207	1,910,290	538,848	118,776	57,943	186,528	166,233	28,708
1937	3,382,894	1,672,352	507,302	109,787	56,615	156,554	144,762	29,247

TABLE V. *Distribution of Livestock by Caidats, 1937*

Region	Civil Control	Caidat	Sheep	Goats	Cattle	Horses	Mules	Asses	Camels	Pigs
Bizertia	Béja	Béja	71,286	41,790	42,146	7,046	1,817	3,644	81	6,410
	Bizerta	{ Bizerta	46,788	18,726	23,489	3,756	2,061	2,809	427	1,045
	Tabarka	{ Mateur	84,824	74,774	47,036	8,025	2,109	3,354	532	2,863
	Souk el Arba	{ Ain Draham	19,647	51,395	22,740	2,754	842	1,512	1	6,405
Tunis		{ Souk el Arba	39,439	63,888	30,952	5,466	2,413	5,701	105	914
		{ Souk el Khemis	32,219	16,870	14,926	2,927	1,016	3,023	66	1,419
		{ Tunis-Ville	154	127	11	785	239	75	..	..
		{ Banlieue de Tunis	74,728	27,603	35,078	6,902	6,569	4,552	826	2,453
Le Kef		{ Zaghouan	76,335	87,197	22,166	3,875	2,482	3,796	1,686	646
		{ Nabeul	72,187	62,269	42,555	3,885	1,741	8,010	3,151	587
		{ Grombalia	14,569	21,119	15,787	1,475	2,171	2,645	477	532
		{ Tebourouk	51,158	49,054	20,479	3,163	2,777	4,327	219	1,374
Sousse		{ Le Kef	115,602	92,566	29,691	7,592	3,379	8,682	442	258
		{ Tadjerouine	172,617	64,102	14,139	7,280	1,927	7,443	443	66
		{ Ouled Ayar	78,197	44,646	12,898	2,297	683	3,655	1,304	13
		{ Ouled Aoun	51,504	32,242	15,462	2,912	1,479	3,610	234	179
Sousse		{ Medjez el Bab	47,180	63,073	23,122	4,690	3,853	5,950	178	2,558
		{ Sousse	139,283	14,425	12,398	2,803	4,061	5,628	5,899	25
		{ Monastir	51,632	1,445	4,563	897	2,080	4,275	4,359	..
		{ Mahdia	69,423	3,399	5,936	1,002	879	4,091	5,309	..
Sousse		{ Souassi	102,161	21,193	4,046	2,236	224	6,501	6,756	..
		{ Kairouan	288,434	55,579	20,094	4,886	1,066	5,362	10,101	323
		{ Zlass	241,971	121,554	19,339	2,598	734	4,779	6,429	619
		{ Fraichiches	118,139	55,936	6,843	4,649	947	4,928	1,417	3
		{ Madjeurs	341,139	152,197	10,933	4,622	842	8,825	9,293	8

Region	Civil Control	Caidat	Sheep	Goats	Cattle	Horses	Mules	Asses	Camels	Pigs	
Sfax	Sfax	{ Sfax	81,944	14,648	668	1,377	2,706	3,853	7,967	321	
		{ Djebliniana	46,643	3,944	1,974	1,159	490	3,006	5,191	..	
	Gabès	{ La Skhirra	139,930	54,835	339	1,472	347	3,260	7,800	..	
		{ Arad	32,715	24,390	243	1,281	1,538	4,209	5,384	146	
	Gafsa	{ Gafsa	150,895	77,035	1,212	986	664	3,581	11,123	36	
		{ Hammama	426,361	120,561	5,011	2,546	292	7,004	11,261	44	
	Tozeur	{ Djerid	5,283	7,862	532	173	184	2,061	799	..	
		{ Djerba	9,569	1,889	291	82	556	2,052	2,549	..	
	Territoires militaires du Sud		{ Querghemma	32,568	31,303	248	1,185	134	4,234	12,196	..
			{ Matmata	11,241	14,767	581	72	1,111	1,176	2,869	..
{ Tatahouine			20,454	48,347	178	718	160	3,503	11,025	..	
{ Nefzaoua			24,675	36,412	96	213	42	1,438	6,863	..	
TOTAL			3,382,894	1,672,352	507,302	109,787	56,615	156,554	144,762	29,247	

APPENDIX I

OIL INSTALLATIONS IN TUNISIA

(before the French North African campaign)

<i>Place</i>	<i>Name of company</i>	<i>Storage capacity in cubic metres</i>	<i>Number of tanks</i>
<i>On the coast</i>			
Bizerta	Naval storage		
	(i) Henchir el Ksiba	50,000 (?)	5
	(ii) Sidi Abdallah dockyard	17,500	7
	(iii) Pointe de la Carrière	2,000	4
	(iv) Near Pointe du Palmier	50,000 (?)	? Under-ground
	(v) Near Baie Ponty	?	2
	(vi) Société Tunisienne des Pétroles	36,300	5
	Shell	200	4
	Société Tunisienne des Pétroles (S.T.P.)	514	3
La Goulette	Shell	20,400	8
	Société Tunisienne des Pétroles (Standard)	14,480	11
	Compagnie industrielle des Pétroles de l'Afrique du Nord (C.I.P.A.N.)	6,000	5
	Compagnie omnium Français des Pétroles	3,000	3
Sfax	Société Tunisienne des Pétroles (S.O.C.)	5,402	10
	Société Française Shell de Tunis	585	3
Sousse	Société Tunisienne de Carburants et Lubrifiants 'Soleil'	1,140	8
	Shell	300	6
	Société Tunisienne des Pétroles	308	5
Tunis	Shell	400	10
Gabès	Shell	150	3
Mahdia	Shell	150	3
Tabarka	Shell	60	2
<i>In the interior</i>			
Bou Arada	Shell	460	4
Mateur	Shell	450	3
Ebba Ksour	Shell	400	5
Medjez el Bab	Shell	350	4
Pont du Fahs	Shell	350	4
Souk el Khemis	Shell	200	4
Béja	Shell	150	3
El Akhouat	Shell	150	3
Le Sers	Shell	150	3
Kairouan	Shell	100	2

APPENDIX J
COMMERCIAL STATISTICS

- Table I. Foreign Trade by Countries, 1930-1938.
- „ II. Principal Exports from Tunisia, 1937-1938, with Principal Destinations, 1938.
- „ III. Principal Imports to Tunisia, 1937-1938, with Principal Sources of Supply, 1938.
- „ IV. Imports of Mineral Oils to Tunisia, 1936-1938.

TABLE I. *Foreign Trade by Countries, 1930-1937*
(Figures in thousands of francs)

	France	Algeria	French colonies	U.K.	British Empire	Italy	Libya	U.S.A.	Belgium	Roumania	Nether-lands ¹	Germany	Spain	Total ²
1930	Imports Exports	1,356,502 578,805	147,711 58,681	9,621 226	61,325 64,309	12,604 27,675	94,787 239,819	11,103 36,117	88,161 27,567	45,754 21,878	39,663 32	7,270 27,840	16,292 9,405	2,107,455 1,127,233
1931	Imports Exports	1,136,986 528,803	187,638 87,389	6,695 96	38,883 56,092	9,041 11,846	85,669 70,648	8,895 20,756	59,628 4,919	28,657 10,597	56,603 ..	17,058 16,724	18,617 8,068	1,872,524 835,872
1932	Imports Exports	1,188,822 613,615	124,159 62,324	..	34,273 38,795	5,494 9,901	72,065 64,659	13,181 23,763	34,915 8,630	25,083 10,806	53,271 22	6,084 10,063	14,275 5,823	1,771,517 861,033
1933	Imports Exports	942,693 372,996	86,794 54,469	..	28,986 36,235	1,129 4,554	62,396 130,518	4,637 19,253	16,266 11,933	23,736 9,173	19,693 15	9,472 10,633	11,806 9,099	1,568,917 685,886
1934	Imports Exports	824,118 344,124	108,061 62,697	..	26,597 51,900	1,135 4,245	54,638 131,188	7,694 21,996	17,135 51,900	19,068 7,358	27,900 23	11,701 11,680	12,863 7,063	1,350,510 674,297
1935	Imports Exports	779,172 425,054	50,213 52,980	702 2	33,556 69,468	12,880 6,672	48,237 113,729	8,474 18,805	50,530 21,262	19,601 8,599	15,206 ..	16,703 13,171	13,978 8,833	1,230,624 772,255
1936	Imports Exports	631,122 504,624	80,913 35,273	4,306 240	28,016 72,688	13,805 3,060	13,610 50,785	510 15,187	34,077 19,659	15,093 22,300	48,224 ..	13,757 17,892	6,057 5,990	1,013,608 840,616
1937	Imports Exports	793,398 653,323	66,286 55,809	2,841 1,303	45,586 156,321	36,795 3,325	40,820 105,570	1,735 24,112	53,399 28,675	17,407 12,207	46,208 8,000	2,879 25,408	3,814 9,950	1,324,312 1,140,876

¹ Including Dutch colonies.

² Including countries not named.

TABLE II. *Principal Exports from Tunisia, 1937-1938, with Principal Destinations, 1938*

Commodity	Unit	1937		1938		Principal destinations (% of value of each item of exports), 1938	
		Quantity	Value (thousands of francs)	Quantity	Value (thousands of francs)		
<i>Animal products and foodstuffs</i>							
Sheep . . .	head	121,013	7,686	65,159	6,215	Libya	82
Goats . . .	"	46,792	1,953	31,650	1,986	Algeria	11
Horses . . .	"	7,133	2,890	4,438	1,841	Libya	97
Meat, fresh and frozen	tons	853	4,331	80	677	Algeria	3
Hides and skins .	"	3,025	30,178	2,709	24,543	France	70
						Malta	18
						France	98
						France	68
						Denmark	10
						Italy	10
						Czechoslovakia	10
Wool . . .	"	3,642	30,388	904	8,633	France	66
Goat- and camel-hair	"	564	3,983	490	4,105	Libya	20
Fish . . .	"	1,277	7,770	780	5,638	U.K.	50
						U.S.A.	27
						France	40
						Italy	20
						Malta	8
Wheat, hard . . .	"	36,113	64,545	27,036	52,005	France	52
Wheat, soft . . .	"	32,248	60,918	55,164	112,727	Algeria	48
Barley . . .	"	34,037	40,666	12,942	17,255	France	99
						France	47
						Algeria	50
Oats . . .	"	11,761	13,096	7,937	10,591	France	70
						Algeria	30
Wheat flour . . .	"	12,185	29,879	14,704	41,126	France	97
Groats and semolina	"	2,042	4,901	9,425	27,179	France	60
Vegetables, dried and fresh	"	15,730	18,362	15,795	21,033	Algeria	15
						France	66
						Algeria	22
						Malta	7
Fruit, fresh, dried, or preserved	"	16,673	33,253	10,713	23,799	France	83
						Algeria	8
						Egypt	6
Olive-oil	"	16,536	123,274	35,193	308,124	France	43
						Italy	37
						U.S.A.	13
						Norway	3
						U.K.	3
Grignons (residues)	"	2,252	9,795	5,287	24,679	U.S.A.	66
Wine (including musts and liqueurs)	hecto-litres	969,038	151,953	1,118,865	176,787	France	17
						France	99
<i>Other vegetable products</i>							
Alfa (esparto grass)	tons	127,035	34,649	129,409	50,009	U.K.	99

Commodity	Unit	1937		1938		Principal destinations (% of value of each item of exports), 1938
		Quantity	Value (thousands of francs)	Quantity	Value (thousands of francs)	
Other vegetable products (cont.)						
Cork . . .	tons	6,336	5,277	5,817	5,293	Algeria 75 U.S.A. 20 France 97
Briar roots . . .	„	192	319	186	327	
Minerals						
Phosphate . . .	„	1,927,792	153,284	1,591,276	132,649	France 30 Italy 30 U.K. 15 Spain 9 Netherlands 9
Iron ore . . .	„	974,458	73,836	802,542	107,139	U.K. 55 Germany 20
Lead ore . . .	„	1,812	1,375	6,267	5,123	Belgium 82
Pig lead . . .	„	26,718	74,550	20,513	58,990	France 98
Zinc ore . . .	„	3,990	1,424	1,045	212	Belgium 100
Salt . . .	„	145,793	4,509	93,552	3,609	France 25 Norway 25 U.S.A. 11 Algeria 9

TABLE III. *Principal Imports to Tunisia, 1937-1938, with Principal Sources of Supply, 1938*

Commodity	Unit	1937		1938		Principal sources of supply (% of value of each item of imports), 1938
		Quantity	Value (thousands of francs)	Quantity	Value (thousands of francs)	
<i>Metal goods</i>						
Iron and steel	tons	25,933	38,585	27,106	42,848	France 90
Machinery	"	7,334	85,113	7,969	102,359	France 70 U.S.A. 20 U.K. 5
Other metal goods	"	15,970	53,770	18,293	78,899	France 88 Germany 7
Cars and chassis	"	2,235	44,030	2,746	69,381	France 90 U.S.A. 8
Other vehicles	"	362	5,653	775	10,650	France 90
<i>Textiles</i>						
Cotton tissues	"	4,435	109,016	4,922	121,570	France 93
Woollen cloth	"	115	4,377	112	5,757	France 80 Algeria 9
Rayon tissues	"	235	11,375	260	13,205	France 90 Japan 5
Jute goods	"	4,747	19,718	3,282	13,701	France 40 French colonies 15 British Empire 10

Commodity	Unit	1937		1938		Principal sources of supply (% of value of each item of imports), 1938	
		Quantity	Value (thousands of francs)	Quantity	Value (thousands of francs)		
<i>Textiles (cont.)</i>							
Clothing . . .	tons	747	17,399	660	14,605	France	70
						Algeria	15
Yarns . . .	"	2,467	25,714	2,448	27,151	France	93
<i>Coal and oil</i>							
Coal . . .	"	213,402	44,600	238,033	58,032	U.K.	80
						Germany	8
						France	6
Petrol ¹ . . .	hecto- litres	886,077	45,930	925,419	54,026	Roumania	92
						Persia	3
Other oils ¹ . . .	tons	40,433	26,001	42,970	31,941	Roumania	60
						U.S.A.	28
						Mexico	10
<i>Foodstuffs</i>							
Sugar . . .	"	36,595	48,811	35,259	65,887	France	99
Coffee . . .	"	1,448	8,608	1,553	7,754	Brazil	96
Tea . . .	"	1,789	26,408	2,093	42,145	British Empire	60
						China	35
Butter . . .	"	740	7,922	1,736	11,528	Netherlands	40
						Denmark	20
						Argentina	20
Cheese . . .	"	1,207	9,682	1,226	12,302	France	40
						Netherlands	25
						Argentina	18
Meat, fresh, frozen, and salt . . .	"	760	7,337	725	8,603	France	60
						Brazil	25
						Poland	10
Wheat . . .	"	15,266	23,053	393	705	Algeria	100
Barley . . .	"	1,621	1,664	5,686	7,335	Algeria	99
Maize . . .	"	10,907	11,232	9,837	12,198	French colonies	52
Rice and rice flour . . .	"	31,989	33,772	53,435	65,982	French colonies	51
						Dutch colonies	20
Fruit . . .	"	9,015	11,050	6,156	10,761	France	16
						Algeria	16
						Egypt	14
						Italy	13
						Iraq	12
Vegetable oils . . .	"	2,469	7,198	1,832	5,537	France	40
						French colonies	35
						Dutch colonies	20
Live sheep . . .	head	11,067	604	78,279	5,358	Algeria	98
Live cattle . . .	"	533	594	5,030	2,695	Algeria	53
						France	47
<i>Other imports</i>							
Tobacco . . .	tons	1,119	5,912	1,720	12,229	U.S.A.	35
						Bulgaria	10
						Dutch colonies	10

¹ For further details, see Table IV (p. 472).

Commodity	Unit	1937		1938		Principal sources of supply (% of value of each item of imports), 1938
		Quantity	Value (thousands of francs)	Quantity	Value (thousands of francs)	
<i>Other imports (cont.)</i>						
Perfumery and soap	tons	4,315	16,141	4,714	22,496	France 94
Medicines . . .	"	410	7,956	494	9,916	France 98
Paper . . .	"	8,476	20,113	5,166	18,795	France 51
						Norway 20
						Algeria 13
						Germany 12
Timber . . .	"	51,040	30,051	56,135	38,189	France 60
						Yugoslavia 25
Fertilizers . . .	"	6,132	2,402	8,774	4,697	France 52
						Algeria 48
Cement . . .	"	40,020	7,340	21,113	5,127	France 90

TABLE IV. Imports of Mineral Oils to Tunisia, 1936-1938

Type	1936	1937	1938		Main sources
	Quantity (tons)	Quantity (tons)	Quantity (tons)	Value (thousands of francs)	
Lubricating oils . . .	4,008	5,279	5,037	11,376	U.S.A. 80%
Gas oils . . .	24,792	28,541	28,438	15,409	France 6%
					Roumania 50%
					Persia 32%
					Dutch colonies 9%
					Iraq 3%
					Venezuela 3%
Diesel oils . . .	2,531	2,915	2,926	1,416	Roumania 100%
Fuel oils . . .	5,702	3,517	6,483	3,432	Mexico 65%
					France 33%
Paraffin and vaseline oils	14	32	41	160	Venezuela 37%
					U.S.A. 34%
Paraffin . . .	15	36	25	69	France 15%
Vaseline . . .	16	13	20	79	Roumania 92%
					Belgium 47%
					U.S.A. 43%

APPENDIX K

GLOSSARY

MOST of the words in this glossary are Arabic or Berber; some European forms are also included. Although not all of them occur in this volume, they are likely to be needed by foreigners in Tunisia and by those using maps or reading literature. Where possible, page references are given to terms explained in the text. Plants are listed separately on p. 478.

French transliteration is used in conformity with policy, but it should be clearly understood that *ch* is pronounced *sh*, and that *ou*, when followed by a vowel, is pronounced *aw* with consonantal *w*: thus *Chaouia* is pronounced *Shawia*, and *asouak*, *aswak*. The French also omit vowels which are usually included in English renderings: thus *Tnine* is pronounced *Tenine* (the *i* being long). The rendering of vowels in French and English varies: thus *beggara* (French) and *baggara* (English), *cheich* (French) and *shash* (English).

The following abbreviations are used: *abbr.* (abbreviation), *adj.* (adjective), *dimin.* (diminutive), *Eng.* (English), *fem.* (feminine), *Fr.* (French), *Ital.* (Italian), *n.* (noun), *p.* (page), *pl.* (plural), *sing.* (singular), *Sp.* (Spanish).

Abankor, shallow well (in Sahara).
Abd (pl. *abid*, *ibad*), servant, black slave.
Abou, *bou*, father of, owner of.
Acheb, type of desert vegetation (p. 99).
Achour, tithe, tax (pp. 160, 360).
Adrar (pl. *idraren*), mountain.
Agadir (pl. *igoudar*), escarpment, fortress.
Aghbalou (pl. *ighboula*), spring.
Agouni, plateau.
Aguelman, *aguelmam*, lake.
Aid (pl. *aiad*), festival.
Ain (pl. *aioun*), spring, well.
Aissa, Jesus Christ.
Ait (sing. *ou*), sons of.
Akbet, slope, ascent.
Akkal, ground, earth.
Ali, high.
Alou, height.
Amadagh, scrub, undergrowth.
Aman, water.
Amin, *amim*, *amrar*, chief of a village or trade (p. 153).
Anaseur (sing. *anseur*), springs.
Ank, pass, defile.
Anse (Fr.), bay, creek.
Anseur, (pl. *anaseur*), spring.

Aourir, mountain peak.
Arasi (sing. *arsa*), orchards.
Arba, four, Wednesday.
Arch, leasehold land (p. 160).
Ard, ground, country.
Ardja, flat ground by a stream.
Areg (sing. *erg*), sand-dunes.
Argoub, hill.
Aricha, small vine.
Arrem, small open village or enclosure.
Arsa (pl. *arasi*), orchard.
Asif (pl. *isaffen*), stream.
Asouak, see *souk*.
Assaba, type of turban (p. 156).
Ateuf, turn, bend.
Azrou, rock.
Azzaben, Mozabite clerk.

Bab (pl. *biban*), entrance, door, gate.
Bachmufti, president of a Malekite court (p. 173).
Baggara, *beggara*, cattle farmers.
Bahar, *bhar*, sea, great river.
Baraka, divine blessing.
Baten, steep cliffs.
Batha, piece of flat, low ground.
Bechna, sorgho (millet).

Beggara, *baggara*, cattle farmers.
Begnuk, embroidered cloth (p. 156).
Bel (abbr. of *ben el*), son of.
Beldi, inhabitant of.
Ben (pl. *beni*), son of.
Bhar, *bahar*, sea, great river.
Biar (sing. *bir*), wells.
Biban (sing. *bab*), entrances, doors, gates.
Bir (pl. *biar*), well.
Blad, small town.
Bled, countryside, region, territory of.
Blida (pl. *bouldane*), town.
Bordj (pl. *boroudj*), bastion, tower, rest-house.
Bou, *abou*, father of, owner of.
Bouira, well.
Bouldane (sing. *blida*), towns.
Bour, uncultivated or fallow land.
Burnous, loose cape with cowl (p. 155).
Cachabia, sleeveless Mozabite tunic.
Cadi, *kadi* (pl. *coudat*), Moslem judge.
Calle, *cala*, creek, cove.
Caid, *kaid* (pl. *kiad*), tribal chief (p. 151).
Chaba, *chabet* (pl. *chaab*), gorge, defile.
Chadouf (Eng. *shaduf*), method of irrigation.
Chair, barley.
Changour, crest, peak.
Char, Islamic law (p. 159).
Chara, religious courts (p. 173).
Chara, street.
Chebka, streams and criss-crossed valleys, chaotic area.
Chechia, turban (p. 156).
Chefaa, right to acquire land (p. 160).
Chegga (pl. *cheggag*), cleft, crevice.
Chehili, *chili*, desert sirocco (p. 73).
Cheich, piece of white cloth wound round the turban (p. 123).
Cheikh (pl. *chioukh*), old man, chief (p. 151).
Chemssse, *chemche*, sun.
Cherchara (pl. *cheracher*), waterfall.
Cherg, east.
Chergui (pl. *cheraga*), oriental, from the east, east wind.
Cherif (pl. *churfa*), holy man.
Cheta, *chta*, *chetoua*, rain.
Chili, *chehili*, desert sirocco (p. 73).
Chioukh (sing. *cheikh*), old men, chiefs (p. 151).

Chott (Eng. *shott*), salt marsh or lake (Photo. 36).
Chreia, *chriat*, passage.
Chriat, natural artesian spring.
Chta, *cheta*, *chetoua*, rain.
Churfa (sing. *cherif*), holy men.
Coudat (sing. *cadi*, *kadi*), Moslem judges.
Dahra, north.
Daia, *daya*, low wet ground, marshy depression (p. 100).
Dalia, vine.
Dar, house, habitation of.
Daya, *daia*, low wet ground, marshy depression (p. 100).
Dechra (pl. *dechour*), village.
Dehar, back, crest.
Dir, cultivated area, tableland (p. 30).
Djama (pl. *djouama*), mosque.
Djebel (pl. *djebal*), (Eng. *jebel*), mountain.
Djebila (pl. *djebilat*), small mountain.
Djemaa (pl. *djemoua*), type of council (p. 160), Friday.
Djemala, camel owners.
Djenane (pl. *djenanat*), garden.
Djerid, country of palms, tribal assembly.
Djezira (pl. *djezirat*), island.
Djorf, escarpment, steep bank.
Djouad, horse, race-horse, desert warrior.
Djouama (sing. *djama*), mosques.
Djouf, north.
Douiat, ponds.
Douar, group of tents, huts, or families.
Dra, arm, spur.
Draa, blue cloak.
El, *ech*, *er*, *es*, *et*, &c., the.
Enfida, ravine.
Enzel, rent (pp. 160, 185).
Erg (pl. *areg*), sand-dune, country or group of sand-dunes.
Faidja, pass.
Fedj, *feidj*, *gassi*, defile, sand-free corridor (in Sahara).
Fegaguir, see *foggara*.
Fejfej, unstable surface of sand.
Fernane, cork oak.
Ferrachia, blanket (p. 209).
Fidjij, *figuig*, small defile.
Flidj, strip of material.

Foggara (pl. *fegaguir*), method of obtaining water by an underground channel.
Fondouk, fondak, covered market, inn.
Fouk, above, top.
Foum, mouth, opening (in Sahara).
Fouta, waist cloth.
Friguia, summer migration (p. 305).

Gada, plateau with vertical cliffs.
Gandoura, white woollen cloak, gown (p. 221).
Gara, garet (pl. *gour*), isolated, flat-topped hill.
Gassi, fedj, feidj, defile, sand-free corridor (in Sahara).
Ghaba, forest.
Ghallen (sing. *ighil*), arms, hills.
Ghar (pl. *ghiran*), cave, hole.
Gharb, west.
Gharbi, western, west wind.
Ghedir, pond, basin of water.
Ghiran (sing. *ghar*), caves, holes.
Ghlila, jacket made of silk.
Ghorfa, grotto, creek, bay, storage-chamber (p. 155, Photos. 52, 104, 105, 135).
Ghors, ghoress, plantation.
Gour (sing. *gara, garet*), isolated, flat-topped hills.
Gourbi, hut, temporary dwelling (p. 154, Photo. 101).
Guebli, southern, south wind (p. 73).
Guelaa, kalaa, kelaa, fortress, often used as a granary.
Guelta (pl. *ogla, oglat*), pool, well.
Guemah, corn.
Guerra, guera, marsh, rain.
Guertif, carpet (p. 209).
Guettar, place where water falls drop by drop.

Habou (Eng. *habu*), Moslem endowment (p. 160).
Had, one, Sunday.
Hadar, town-dwellers.
Hadjeb (pl. *houadjeb*), side of mountain.
Haik (pl. *hiyyak*), long white robe (p. 155).
Hait, wall.
Hamada, hammada, rocky plateau or desert.
Hamma, warm spring.
Hammada, hamada, rocky plateau or desert.

Hammam, bath.
Hamri, fertile red earth.
Hank, tributary.
Haouch, farm.
Haouli, cover (p. 209).
Haratin, Berber-negro half-castes.
Harra, Jewish quarters (p. 147).
Hassi (pl. *houasi, hasian*), well, water-point.
Henchir, ruins, farm.
Hezzab, official of a mosque.
Hiyyak (sing. *haik*), long white robes (p. 155).
Hodna, plain surrounded by mountains.
Hofra, hole.
Horma, honour (of a tribe).
Houadjeb, see *hadjeb*.
Houasi, hasian (sing. *hassi*), wells, water-points.

Ibad, abid (sing. *abd*), servants, black slaves.
Ida, sons of.
Idraren (sing. *adrar*), mountains.
Ifri (pl. *ifran*), precipice, gulf.
Ighboula (sing. *aghbalou*), springs.
Ighil (pl. *ghallen*), arm, hill.
Ighzer (pl. *ighzran*), ravine, stream.
Igoudar (sing. *agadir*), escarpments, fortresses.
Ikhf (pl. *ikhfaouen*), head, summit.
Imam, leader of prayers in a mosque (p. 157).
Imi (pl. *imiouen*), door, mouth, opening.
Imin, defile.
Isaffen (sing. *asif*), streams.
Issar, left.
Istitan, capitation tax (pp. 160, 360).

Ƶ. See under *Dj*.

Kaa, bottom, ground, market.
Kadi, cadi (pl. *coudat*), Moslem judge.
Kadous, conduit, pipe.
Kahia, caid's assistant (p. 159).
Kaid, caid (pl. *kiad*), tribal chief (p. 151).
Kalaa, rugged feature (p. 36).
Kalaa, kelaa, guelaa, fortress, often used as a granary.
Kanoun, type of tax (pp. 160, 360).
Kantara, kantra, kantret, kentra (pl. *knater*), arch, bridge.
Karadj, tribute (p. 160).

- Kasba, kasbah, kasbet* (pl. *ksabi*), citadel, stronghold.
- Katifa*, article of clothing (p. 156).
- Kbila* (pl. *kbayil*), small autonomous group of people.
- Kebab*, see *koubba*.
- Kebir*, great, chief of a village.
- Kechla*, barracks.
- Kef* (pl. *kifan*), rock, cliff, hill (p. 30).
- Kelaa, kalaa, guelaa*, fortress, often used as a granary.
- Kentra, kantra, kantret, kantara* (pl. *knater*), arch, bridge.
- Kerkour* (pl. *kraker*), pile of stones.
- Kerma*, vine.
- Kermousse*, fig.
- Khalifa*, caid's assistant (p. 159).
- Khaloua*, retreat, hermitage.
- Khammes*, type of tenant (p. 281).
- Khammesat*, form of contract (p. 281).
- Khamsa*, five.
- Khandek*, drainage canal.
- Khang* (pl. *kheneg, kheng*), defile, gorge.
- Khatib*, official of a mosque.
- Khemis*, Thursday.
- Kheneg, kheng* (sing. *khanga*), defiles, gorges.
- Kherba, kherbet*, ruins.
- Kiad* (sing. *kaid, caid*), tribal chiefs (p. 151).
- Kib*, type of gourbi (p. 154).
- Kifan* (sing. *kef*), rocks, cliffs, hills.
- Knater* (sing. *kantara, kantra, kantret, kentra*), arches, bridges.
- Knitra* (dimin. of *kantra*), small bridge.
- Kohl, koheul*, native cosmetic (p. 158).
- Koubba* (pl. *kebeb*), sanctuary, room, dome, tomb of Moslem saint (p. 157).
- Kraker* (sing. *kerkour*), piles of stones.
- Krakral*, anklets (p. 156).
- Ksar* (pl. *ksour*), fortified town, walled village.
- Ksabi* (sing. *kasba, kasbah, kasbet*), citadels, strongholds.
- Ksour* (sing. *ksar*), fortified towns, walled villages (p. 155).
- Lalla*, lady (title of female saint).
- Liiham*, veil worn by Touareg men.
- Loul*, grains of drinn (p. 98).
- Ma*, water.
- Maacha*, hand-plough (p. 297).
- Maamra*, type of gourbi (p. 154).
- Macchia* (Ital.), *maquis* (Fr.), thicket.
- Maden, madene*, mineral, mine.
- Maghreb*, west, sunset.
- Mahdi*, messiah (p. 223).
- Malhafa*, tunic (p. 156).
- Manqa*, basin in olive-grove (p. 295).
- Maquis* (Fr.), *macchia* (Ital.), thicket.
- Marabout, mrabit* (pl. *mrabitin*), Moslem priest or saint, holy man (p. 157).
- Mascara*, camp.
- Marsa, mers, mersa, mersat* (pl. *mrasi*), port, anchorage.
- Mechra*, ford.
- Mechta*, house used in winter (p. 153).
- Medersa*, Moslem college (p. 157).
- Medina, medinet* (pl. *medoun*), Arab town.
- Mehasser*, isolated mass of rock in valleys (in Sahara).
- Medjex, meguez*, ford.
- Mehalla*, army.
- Mekam*, resting-place.
- Mekebra* (pl. *mkaber*), cemetery.
- Mela, melah* (adj.), *melh* (noun), salt.
- Mellah*, Jewish quarter.
- Melk*, freehold land (p. 160).
- Menar*, lighthouse.
- Menzeh*, observatory, room on upper floor.
- Merdja, merja* (pl. *mroudj*), marsh.
- Mers, mersa, mersat, marsa* (pl. *mrasi*), port, anchorage.
- Meskat*, hill-slopes (p. 41).
- Mgharsa*, form of contract (p. 281).
- Mgharsi*, type of tenant (p. 281).
- Mihrab*, niche in mosque indicating direction of Mecca.
- Mizab*, gutter, water-pipe.
- Mkaber* (sing. *mekebra*), cemeteries.
- Mokkadem*, administrator in a medersa, trustee (pp. 157, 160).
- Mongar*, peak.
- Mouderris*, official of a mosque.
- Mouekkit*, official of a mosque.
- Mougakate*, form of contract (p. 281).
- Mouloui* (fem. *moulouya*), winding, tortuous.
- Mrabit, marabout* (pl. *mrabitin*), Moslem priest or saint, holy man (p. 157).
- Mrasi* (sing. *mers, mersa, mersat, marsa*), ports, anchorages.
- Mrasla*, written opinion of a caidi (p. 160).
- Mroudj* (sing. *merdja, merja*), marshes.

Muezzine, official of a mosque.
Mufti, interpreter of Moslem law (p. 159).

Nador, watch-tower, semaphore.
Nahr, river.
Naib, representative of a djemaa (p. 160).
Nebka, small dune.
Noria, waterwheel.
Nouala (pl. *nounail*), hut.
Nzala, shelter, halting-place.

Ouest, middle.
Oghourd, pyramid sand peaks (in Sahara).
Ogla, *oglat* (sing. *guelta*), group of wells.
Ou (pl. *ait*), son of.
Oued (pl. *ouidan*) (Eng. *wadi*, *wad*), river, stream, dry watercourse.
Oukil, official in charge of land (p. 160).
Ouldja, land surrounded by the bend of a river.
Ouled, sons of.
Oum, mother of, head of a valley.
Outa, plain.
Ourit, gulf, chasm.
Outika, type of affidavit (p. 160).
Ouzara, secular courts (p. 174).

Rahba, square, market.
Ras (pl. *rous*), cape, headland, summit.
Reg, stony plain, gravel desert.
Reha (pl. *rhi*), mill.
Rh, see under *Gh*.
Ribat (pl. *riah*, *rouah*), wind.
Rio (Sp.), river.
Rmel, sand, sandy earth.
Rouah, *riah* (sing. *ribat*), winds.
Rouda, cemetery.
Rous (sing. *ras*), capes, headlands, summits.
Rsif, outcrop of rocks.

Sahel, coast, shore.
Sahra, *sahara*, wilderness, desert.
Samia, garden, water-wheel.
Scirocco, *sirocco*, dry south wind (p. 73).
Sebaa, seven.
Sebkha (Fr. *sebkra*, *sebkret*), salt lake, often dry; enclosed basin.
Sebt, Saturday.
Seguia (pl. *souagui*), irrigation channel, distributing canal.
Seif, *sif*, dune.

Sejra (pl. *sjour*), tree.
Serroual, wide trousers worn by women.
Sfaiet, rocky plateau (p. 30).
Sh. See under *Ch*.
Si, Sir, Mr. (used before name of educated person).
Sidi, Master (used before name of noble or saint).
Sif, *seif*, dune.
Sirocco, *scirocco*, dry south wind (p. 73).
Sjebba, type of burnous (p. 156).
Sjour (sing. *sejra*), trees.
Skhour, rocks.
Smala, small fort occupied by spahis.
Sof, group of blood-relations.
Sokhra, rock.
Souagui (sing. *segua*), irrigation channels, distributing canals.
Souama (sing. *soumaa*, *soummam*), minarets.
Souk (pl. *asouak*), market, market-place (p. 153), often followed by the day of the market: e.g. *Souk el Had*, Sunday market.
Soumaa, *soummam* (pl. *souama*), minaret.
Sour, rampart.
Spahi, native cavalry in French service.
Sraouat, high plain (p. 37).

Tabia, type of clay (p. 154).
Tadchira, kerchief (p. 156).
Taddert, *thaddert*, group of tents, huts, or families.
Taksebt, citadel.
Tala, *talaint*, spring.
Tamda, lake, pond.
Tamgout, summit, peak.
Tanezrouft, absolute desert.
Tanout, well.
Taourirt, small peak.
Tarf, cape.
Tassili, barren plateaux.
Tebene, straw.
Tegbil, winter migration (p. 304).
Tell, inhabited and partly cultivated high ground.
Ténéré, absolute desert.
Tenia, *teniet*, pass.
Tetaouene, *titaouine* (sing. *tit*), springs, sources, eyes.
Thaddert, *taddert*, group of tents, huts, or families.
Timchent, type of mortar of limestone and gypsum.

Timezguida, mosque.

Tit (pl. *titaouine*, *tetaouene*), spring, source, eye.

Tizgui, forest.

Tizi, pass, col.

Tleta, three, Tuesday.

Tnine, two, Monday.

Toub, mixture of clay and chopped straw, for building purposes (p. 154).

Tounsi, Tunisian.

Trik, road, track.

Wad, *wadi* (Fr. *oued*), river, stream, dry watercourse.

Zab (pl. *ziban*), oasis.

Zaouia, shrine, monastery (p. 157).

Zeriba, type of gourbi (p. 154).

Ziban (sing. *zab*), oases.

Zit, oil.

Zouave, native infantry.

Zra (dimin. *zria*), grain, barley.

Zriba, *zribet*, hedge, enclosure.

ARABIC NAMES OF PLANTS

Arar, Barbary thuya.

Arez, *meddad*, Atlas cedar.

Betoum, Atlantic turpentine tree.

Chih, white wormwood.

Defla, oleander.

Derou, lentisk, mastic.

Diss, diss.

Doum, dwarf palm.

Fernane, *fermana*, cork oak.

Guerrouch, holm oak.

Guettaf, orach.

Halfa, alfa.

Irak, irak.

Meddad, *arez*, Atlas cedar.

Sedra, jujube, lotus.

Sennar, sparte.

Snouber, Aleppo pine.

Tagga, red juniper.

Talha, *thala*, acacia (gum).

Tarfa, *ilaia*, jointed tamarisk.

Zan, *zen*, Portuguese (zen) oak.

Zebbouj, *zeitoun*, olive.

APPENDIX L

NOTE ON LITERATURE, MAPS AND CHARTS, AND AUTHORSHIP

LITERATURE

No geographical handbook of Tunisia was published by the Admiralty during the War of 1914-1918, and the geographical literature is mainly in French. Relatively little is available in English apart from a number of books of varying quality written by travellers. The following list includes some of the books and articles that have been found useful in the preparation of this volume, together with certain books not at present available in this country, but it is not to be regarded as a complete guide to the geographical literature. Bibliographies will be found in many of the publications included below.

GENERAL

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Atlas des colonies françaises, protectorats, et territoires sous mandat de la France (Paris, 1932) (text and maps).
The various topographical maps published by the Service Géographique de l'Armée are listed on p. 483. Geological maps on a scale of 1/200,000 are available for some areas.

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 KNOX, A. *The Climates of the Continent of Africa* (Cambridge, 1911).
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- BANNERMAN, D. A. *The Birds of Tunisia* (London, 1927).
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of all important contributions are given in either the *Bulletin of Hygiene* or the *Tropical Diseases Bulletin*, published by the Bureau of Hygiene and Tropical Diseases, London.

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MAPS AND CHARTS

The Service Géographique de l'Armée has published maps of all parts of Tunisia: many of these have been reproduced by the Geographical Section, General Staff. G.S., G.S. numbers are given in the following list:

Scale	G.S., G.S. number
1/50,000	4225
1/100,000	4226
1/200,000	4227
1/500,000	4175
1/1,000,000	2465
1/2,000,000	2871

The sheets of the 1/2,000,000, 1/1,000,000, and 1/500,000 series covering Tunisia are illustrated in Fig. 3.

The 'Afrique Nord-ouest' sheet (Feuille No. 1) of the 1/5,000,000 map produced by the Service Géographique de l'Armée includes the whole of Tunisia.

There are town-plans of Bizerta, Gabès, Sfax, Sousse, and Tunis-la-Goulette on various scales (G.S., G.S. No. 4274).

The following Michelin maps have also been used:

Africa road maps (G.S., G.S. No. 4256), Sheet 151, Maroc-Algérie-Tunisie (1/2,000,000 and 1/500,000), and Sheet 152, Pistes du Sahara (1/4,000,000).

Charts. The following are the numbers of the Admiralty charts and plans of Tunisia: 160, 246, 249, 250, 252, 1159, 1162, 1184, 1381, 1569, 2158 A, 2158 B. There is an index to these charts facing p. 1 of the *Mediterranean Pilot*, vol. i (1937). Fuller information is given in the *Catalogue of Admiralty charts and other hydrographic publications*.

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Assistance has been given by Service departments, the Meteorological Office, the Ministry of Economic Warfare, the Ministry of Information, and the Royal Geographical Society.

APPENDIX M

CONVERSION TABLES

METRIC AND BRITISH UNITS

All metallic standards are subject to molecular change. Tables differ according to the date of the comparison on which they rest. These are based on the 1896 comparison between Yard and Metre, which gives:

$$1 \text{ metre} = 39.370113 \text{ inches.}$$

Tables 1 to 6 give the ratios between units of the same sort.

Space, and printing, deny the use of many decimal figures. Therefore such a figure as 0.00000032 is given as 3.2×10^{-7} (which means that the first significant figure is the seventh after the decimal point: 0.0001925 becomes 1.925×10^{-4} , and 0.0000734 is 7.34×10^{-5}).

Tables 7 to 20 give ratios *in extenso* between single units.

These deal with conversions from metric into the equivalent British units.

Figures referring to metric units are given in italics; metric units (1 to 9) are given at the top of each table, reading horizontally from left to right; metric tens read vertically from top to bottom on extreme right and left of the table.

Thus in Table 8, if 87 centimetres are to be converted to inches, the 8 is read on the left or right edge, and, following the horizontal line until the 7 unit column is reached, the answer 34.252 is read.

LIST OF TABLES

1. Units of Length
2. Units of Area
3. Units of Volume
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6. Yields per Area
7. Metres to Feet
8. Centimetres to Inches
9. Kilometres to Statute Miles
10. Square Metres to Square Feet
11. Hectares to Acres
12. Square Kilometres to Square Miles
13. Cubic Metres to Cubic Feet
14. Kilogrammes to Pounds
15. Litres to Gallons
16. Metric Tons to Tons
17. Quintals per Hectare to Tons per Acre
18. Numbers per Hectare Kilometre to Numbers per Square Mile
19. Degrees Centigrade to Degrees Fahrenheit
20. Millibars, Millimetres of Mercury, and Inches of Mercury

TABLE 1. UNIT OF LENGTH.

Nautical mile	Statute mile	Kilometre	Metre	Yard	Foot	Inch	Centimetre
1	1.152	1.853	1853	2027	46080	72,960	185,300
8.684×10^{-1}	1.60934	1.60934	1609.34	1760	5280	63,360	160,934
5.396×10^{-1}	6.21372×10^{-1}	1.0	1000	1093.61	3280.84	39,370.1	100,000
5.396×10^{-4}	6.21372×10^{-4}	1.0×10^{-3}	1.0	1.09361	3.28084	39.3701	100
4.934×10^{-4}	5.68182×10^{-4}	9.14399×10^{-4}	9.14399×10^{-1}	1.0	3	36	91.4399
1.645×10^{-4}	1.89394×10^{-4}	3.048×10^{-4}	3.048×10^{-1}	3.33333×10^{-1}	1.0	12	30.48(00)
1.371×10^{-3}	1.57828×10^{-3}	2.54×10^{-3}	2.54×10^{-2}	2.77778×10^{-2}	8.33333×10^{-2}	1.0	$2.54(000)$
5.396×10^{-6}	6.21372×10^{-6}	1.0×10^{-5}	1.0×10^{-2}	1.09361×10^{-2}	3.28084×10^{-2}	3.93701×10^{-1}	1.0

† This is the customary British practice, and not the international nautical mile, of 1852 metres, which Great Britain has not adopted.

Rough rules: 1 millimetre = 0.04 inch.

1 metre = $\frac{10}{3}$ feet.

1 kilometre = $\frac{5}{8}$ of a mile.

TABLE 2. UNITS OF AREA

Square mile	Square kilometre	Hectare	Acre	Square metre	Square yard	Square foot
1	2.58998	258.998	640	$258,998 \times 10$	$30,976 \times 10^2$	$278,784 \times 10^2$
3.86103×10^{-1}	1.0×10^{-2}	100	247.106	1,000,000	$119,599 \times 10$	$107,639 \times 10^2$
3.86103×10^{-3}	4.04685×10^{-1}	1.0	2.47106	10,000	11,959.9	107,639
1.5625×10^{-3}	1.0×10^{-4}	1.0×10^{-4}	1.0	4046.85	4840	43,560
3.86103×10^{-7}	1.0×10^{-6}	8.36126×10^{-5}	2.47106×10^{-4}	1.0	1.19599	10.7639
3.22831×10^{-7}	8.36126×10^{-7}	8.36126×10^{-5}	2.06612×10^{-4}	8.36126×10^{-1}	1.0	9
3.58701×10^{-8}	9.29029×10^{-8}	9.29029×10^{-6}	2.29568×10^{-5}	9.29029×10^{-2}	1.11111×10^{-1}	1.0

Rough rules: 1 square kilometre = $\frac{3}{8}$ square mile.

1 hectare = $2\frac{1}{2}$ acres.

TABLE 3. UNITS OF VOLUME

Kiloliitre	Cubic metre	Cubic yard	Bushel	Cubic foot	Imp. gall.	Litre	Pint
<i>I</i>	1·000027	1·30799	27·4969	35·3157	219·976	1000	1759·80
$9·99973 \times 10^{-1}$	<i>I</i>	1·30795	27·4962	35·3148	219·970	999·973	1759·75
$7·94532 \times 10^{-1}$	$7·64553 \times 10^{-1}$	<i>I</i>	21·0223	27	168·178	764·532	1345·43
$3·63677 \times 10^{-1}$	$3·63687 \times 10^{-2}$	$4·75685 \times 10^{-2}$	<i>I</i>	1·28435	8	36·3677	64
$2·83160 \times 10^{-2}$	$2·83167 \times 10^{-2}$	$3·70370 \times 10^{-2}$	$7·8602 \times 10^{-1}$	<i>I</i>	6·22882	28·3160	49·8306
$4·84596 \times 10^{-3}$	$4·84608 \times 10^{-3}$	$5·94607 \times 10^{-3}$	$1·25 \times 10^{-1}$	$1·60544 \times 10^{-1}$	<i>I</i>	4·84596	8
$1·0 \times 10^{-3}$	$1·000027 \times 10^{-3}$	$1·30799 \times 10^{-3}$	$2·74969 \times 10^{-2}$	$3·53157 \times 10^{-2}$	$2·19976 \times 10^{-1}$	<i>I</i>	1·75980
$5·68245 \times 10^{-4}$	$5·68260 \times 10^{-4}$	$7·43258 \times 10^{-4}$	$1·5625 \times 10^{-2}$	$2·00680 \times 10^{-2}$	$1·25 \times 10^{-1}$	$5·68245 \times 10^{-1}$	<i>I</i>

TABLE 4. UNITS OF WEIGHT

† Ton	Millier or metric ton	Quintal	Kilogramme	lb.
<i>I</i>	1·01605	10·1605	1016·05	2240
$9·84207 \times 10^{-1}$	<i>I</i>	10	1000	2204·62
$9·84207 \times 10^{-2}$	$1·0 \times 10^{-1}$	<i>I</i>	100	220·462
$9·84207 \times 10^{-3}$	$1·0 \times 10^{-3}$	$1·0 \times 10^{-2}$	<i>I</i>	2·20462
$4·46429 \times 10^{-4}$	$4·53592 \times 10^{-4}$	$4·53592 \times 10^{-3}$	$4·53592 \times 10^{-1}$	<i>I</i>

† The ton of 2240 lb. is sometimes called the "Long Ton" to distinguish it from the "Short Ton" of 2000 lb.

Rough rule: To turn metric into British tons deduct $\frac{1}{3}$ per cent.

TABLE 5. UNITS OF PRESSURE

Atmosphere normal 760 mm. Hg at 0° C. ($g = 980.665 \text{ cm. per sec.}$ per sec.)	Bar ($= 10^6 \text{ dynes per sq. cm.}$)	lb. per sq. inch ($g = 980.665 \text{ cm. per sec.}$ per sec.)	Inches of mercury at 32° F. ($g = 980.665 \text{ cm. per sec.}$ per sec.)	Millibars (1,000 dynes per sq. cm.)
I	1.01325	14.6959	29.9213	1013.25
9.86923×10^{-1}	I	14.5937	29.5300	1000
6.80461×10^{-2}	6.89477×10^{-2}	I	2.03603	68.9477
3.34210×10^{-2}	3.38639×10^{-2}	4.91153×10^{-1}	I	33.8639
9.86923×10^{-4}	1.0×10^{-3}	1.45037×10^{-2}	2.95300×10^{-2}	I

TABLE 6. YIELD PER AREA

Ton per acre	Metric ton per hectare	Quintal per hectare
I	2.51071	25.1071
3.98294×10^{-1}	I	10
3.98294×10^{-2}	1.0×10^{-1}	I

TABLE 7. METRES TO FEET. 1 metre = 3.28084 feet

	0	1	2	3	4	5	6	7	8	9	
1	3.3	6.6	9.8	13.1	16.4	19.7	23.0	26.3	29.5	32.8	1
2	36.1	39.4	42.7	45.9	49.2	52.5	55.8	59.1	62.3	65.6	2
3	68.9	72.2	75.5	78.7	82.0	85.3	88.6	91.9	95.1	98.4	3
4	101.7	105.0	108.3	111.6	114.8	118.1	121.4	124.7	128.0	131.2	4
5	134.5	137.8	141.1	144.4	147.6	150.9	154.2	157.5	160.8	164.0	5
6	167.3	170.6	173.9	177.2	180.5	183.7	187.0	190.3	193.6	196.9	6
7	200.1	203.4	206.7	210.0	213.3	216.5	219.8	223.1	226.4	229.7	7
8	232.9	236.2	239.5	242.8	246.1	249.3	252.6	255.9	259.2	262.5	8
9	265.8	269.0	272.3	275.6	278.9	282.2	285.4	288.7	292.0	295.3	9
10	298.6	301.8	305.1	308.4	311.7	315.0	318.2	321.5	324.8	328.1	10
11	331.4	334.6	337.9	341.2	344.5	347.8	351.0	354.3	357.6	360.9	11
12	364.2	367.5	370.7	374.0	377.3	380.6	383.9	387.1	390.4	393.7	12
13	397.0	400.3	403.5	406.8	410.1	413.4	416.7	419.9	423.2	426.5	13
14	429.8	433.1	436.4	439.6	442.9	446.2	449.5	452.8	456.0	459.3	14
15	462.6	465.9	469.2	472.4	475.7	479.0	482.3	485.6	488.8	492.1	15
16	495.4	498.7	502.0	505.2	508.5	511.8	515.1	518.4	521.7	524.9	16
17	528.2	531.5	534.8	538.1	541.3	544.6	547.9	551.2	554.5	557.7	17
18	561.0	564.3	567.6	570.9	574.1	577.4	580.7	584.0	587.3	590.6	18
19	593.8	597.1	600.4	603.7	607.0	610.2	613.5	616.8	620.1	623.4	19
20	626.6	629.9	633.2	636.5	639.8	643.0	646.3	649.6	652.9	656.2	20
21	659.4	662.7	666.0	669.3	672.6	675.9	679.1	682.4	685.7	689.0	21
22	692.3	695.5	698.8	702.1	705.4	708.7	711.9	715.2	718.5	721.8	22
23	725.1	728.3	731.6	734.9	738.2	741.5	744.8	748.0	751.3	754.6	23
24	757.9	761.2	764.4	767.7	771.0	774.3	777.6	780.8	784.1	787.4	24
25	790.7	794.0	797.2	800.5	803.8	807.1	810.4	813.7	816.9	820.2	25
26	823.5	826.8	830.1	833.3	836.6	839.9	843.2	846.5	849.7	853.0	26
27	856.3	859.6	862.9	866.1	869.4	872.7	876.0	879.3	882.5	885.8	27
28	889.1	892.4	895.7	899.0	902.2	905.5	908.8	912.1	915.4	918.6	28
29	921.9	925.2	928.5	931.8	935.0	938.3	941.6	944.9	948.2	951.4	29
30	954.7	958.0	961.3	964.6	967.8	971.1	974.4	977.7	981.0	984.3	30
31	987.5	990.8	994.1	997.4	1000.7	1003.9	1007.2	1010.5	1013.8	1017.1	31
32	1020.3	1023.6	1026.9	1030.2	1033.5	1036.7	1040.0	1043.3	1046.6	1049.9	32
	1053.1	1056.4	1059.7	1063.0	1066.3	1069.6	1072.8	1076.1	1079.4		

	0	1	2	3	4	5	6	7	8	9	
33	1082.7	1086.0	1089.2	1092.5	1095.8	1099.1	1102.4	1105.6	1108.9	1112.2	33
34	1115.5	1118.8	1122.0	1125.3	1128.6	1131.9	1135.2	1138.5	1141.7	1145.0	34
35	1148.3	1151.6	1154.9	1158.1	1161.4	1164.7	1168.0	1171.3	1174.5	1177.8	35
36	1181.1	1184.4	1187.7	1190.9	1194.2	1197.5	1200.8	1204.1	1207.3	1210.6	36
37	1213.9	1217.2	1220.5	1223.8	1227.0	1230.3	1233.6	1236.9	1240.2	1243.4	37
38	1246.7	1250.0	1253.3	1256.6	1259.8	1263.1	1266.4	1269.7	1273.0	1276.2	38
39	1279.5	1282.8	1286.1	1289.4	1292.7	1295.9	1299.2	1302.5	1305.8	1309.1	39
40	1312.3	1315.6	1318.9	1322.2	1325.5	1328.7	1332.0	1335.3	1338.6	1341.9	40
41	1345.1	1348.4	1351.7	1355.0	1358.3	1361.5	1364.8	1368.1	1371.4	1374.7	41
42	1378.0	1381.2	1384.5	1387.8	1391.1	1394.4	1397.6	1400.9	1404.2	1407.5	42
43	1410.8	1414.0	1417.3	1420.6	1423.9	1427.2	1430.4	1433.7	1437.0	1440.3	43
44	1443.6	1446.9	1450.1	1453.4	1456.7	1460.0	1463.3	1466.5	1469.8	1473.1	44
45	1476.4	1479.7	1482.9	1486.2	1489.5	1492.8	1496.1	1499.3	1502.6	1505.9	45
46	1509.2	1512.5	1515.7	1519.0	1522.3	1525.6	1528.9	1532.2	1535.4	1538.7	46
47	1542.0	1545.3	1548.6	1551.8	1555.1	1558.4	1561.7	1565.0	1568.2	1571.5	47
48	1574.8	1578.1	1581.4	1584.6	1587.9	1591.2	1594.5	1597.8	1601.0	1604.3	48
49	1607.6	1610.9	1614.2	1617.5	1620.7	1624.0	1627.3	1630.6	1633.9	1637.1	49
50	1640.4	1643.7	1647.0	1650.3	1653.6	1656.8	1660.1	1663.4	1666.7	1669.9	50
51	1673.2	1676.5	1679.8	1683.1	1686.4	1689.6	1692.9	1696.2	1699.5	1702.8	51
52	1706.0	1709.3	1712.6	1715.9	1719.2	1722.4	1725.7	1729.0	1732.3	1735.6	52
53	1738.8	1742.1	1745.4	1748.7	1752.0	1755.2	1758.5	1761.8	1765.1	1768.4	53
54	1771.7	1774.9	1778.2	1781.5	1784.8	1788.1	1791.3	1794.6	1797.9	1801.2	54
55	1804.5	1807.8	1811.0	1814.3	1817.6	1820.9	1824.1	1827.4	1830.7	1834.0	55
56	1837.3	1840.6	1843.8	1847.1	1850.4	1853.7	1857.0	1860.2	1863.5	1866.8	56
57	1870.1	1873.4	1876.6	1879.9	1883.2	1886.5	1889.8	1893.0	1896.3	1899.6	57
58	1902.9	1906.2	1909.4	1912.7	1916.0	1919.3	1922.6	1925.9	1929.1	1932.4	58
59	1935.7	1939.0	1942.3	1945.5	1948.8	1952.1	1955.4	1958.7	1961.9	1965.2	59
60	1968.5	1971.8	1975.1	1978.3	1981.6	1984.9	1988.2	1991.5	1994.8	1998.0	60
61	2001.3	2004.6	2007.9	2011.1	2014.4	2017.7	2021.0	2024.3	2027.6	2030.8	61
62	2034.1	2037.4	2040.7	2044.0	2047.2	2050.5	2053.8	2057.1	2060.4	2063.6	62
63	2066.9	2070.2	2073.5	2076.8	2080.1	2083.3	2086.6	2089.9	2093.2	2096.5	63
64	2099.7	2103.0	2106.3	2109.6	2112.9	2116.1	2119.4	2122.7	2126.0	2129.3	64
65	2132.5	2135.8	2139.1	2142.4	2145.7	2149.0	2152.3	2155.5	2158.8	2162.1	65
66	2165.4	2168.6	2171.9	2175.2	2178.5	2181.8	2185.1	2188.3	2191.6	2194.9	66

TABLE 8. CENTIMETRES TO INCHES

1 centimetre = 0.393701 inches

[illegible]

TABLE 9. KILOMETRES TO STATUTE MILES

1 kilometre = 0.621372 miles

[illegible]

1 square metre = 10.76391 square feet

[illegible]

1 hectare = 2.47106 acres

[illegible]

TABLE 12. SQUARE KILOMETRES TO SQUARE MILES

1 square kilometre = 0.386103 square miles

[illegible]

TABLE 13. CUBIC METRES TO CUBIC FEET

π cubic metre $= 35.3148$ cubic feet

[illegible]

TABLE 14. KILOGRAMMES TO POUNDS

1 kilogramme = 2.20462 pounds

[illegible]

TABLE 15. LITRES TO GALLONS

1 litre = 0.219976 gallons

[illegible]

1 metric ton = 0.984207 ton

[illegible]

1 quintal per hectare = 0.0398294 ton per acre

[illegible]

TABLE 18. NUMBERS PER SQUARE KILOMETRE TO NUMBERS PER SQUARE MILE
(or Square Miles to Square Kilometres)

1 square mile = 2.58998 square kilometres

	0	1	2	3	4	5	6	7	8	9	
..	..	2'59	5'18	7'77	10'36	12'95	15'54	18'13	20'72	23'31	..
1	25'90	28'49	31'08	33'67	36'26	38'85	41'44	44'03	46'62	49'21	1
2	51'80	54'39	56'98	59'57	62'16	64'75	67'34	69'93	72'52	75'11	2
3	77'70	80'29	82'88	85'47	88'06	90'65	93'24	95'83	98'42	101'01	3
4	103'60	106'19	108'78	111'37	113'96	116'55	119'14	121'73	124'32	126'91	4
5	129'50	132'09	134'68	137'27	139'86	142'45	145'04	147'63	150'22	152'81	5
6	155'40	157'99	160'58	163'17	165'76	168'35	170'94	173'53	176'12	178'71	6
7	181'30	183'89	186'48	189'07	191'66	194'25	196'84	199'43	202'02	204'61	7
8	207'20	209'79	212'38	214'97	217'56	220'15	222'74	225'33	227'92	230'51	8
9	233'10	235'69	238'28	240'87	243'46	246'05	248'64	251'23	253'82	256'41	9
10											10

TABLE 19. DEGREES CENTIGRADE TO DEGREES FAHRENHEIT

1° Centigrade = 1.8° Fahrenheit

Centigrade minus												Centigrade plus											
	-2	-1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9											
-2	-40	-58	-76	-94	-112	-130	-148	-166	-184	-202	-220	-238	-2	140	122	104	86	68	50	32	14		
-1	140	122	104	86	68	50	32	14	-04	-22	-40	-58	1	140	122	104	86	68	50	32	14		
0	320	302	284	266	248	230	212	194	176	158	140	122	2	320	302	284	266	248	230	212	194		
1	320	338	356	374	392	410	428	446	464	482	500	518	3	320	338	356	374	392	410	428	446		
2	500	518	536	554	572	590	608	626	644	662	680	698	4	500	518	536	554	572	590	608	626		
3	680	698	716	734	752	770	788	806	824	842	860	878	5	680	698	716	734	752	770	788	806		
4	860	878	896	914	932	950	968	986	1004	1022	1040	1058	6	860	878	896	914	932	950	968	986		
5	1040	1058	1076	1094	1112	1130	1148	1166	1184	1202	1220	1238	7	1040	1058	1076	1094	1112	1130	1148	1166		
6	1220	1238	1256	1274	1292	1310	1328	1346	1364	1382	1400	1418	8	1220	1238	1256	1274	1292	1310	1328	1346		
7	1400	1418	1436	1454	1472	1490	1508	1526	1544	1562	1580	1598	9	1400	1418	1436	1454	1472	1490	1508	1526		
8	1580	1598	1616	1634	1652	1670	1688	1706	1724	1742	1760	1778	10	1580	1598	1616	1634	1652	1670	1688	1706		
9	1760	1778	1796	1814	1832	1850	1868	1886	1904	1922	1940	1958		1760	1778	1796	1814	1832	1850	1868	1886		
10	1940	1958	1976	1994	2012	2030	2048	2066	2084	2102	2120	2138		1940	1958	1976	1994	2012	2030	2048	2066		

TABLE 20. PRESSURE: EQUIVALENTS OF MILLIBARS, MILLIMETRES OF MERCURY, AND INCHES OF MERCURY AT 32° F. IN LATITUDE 45°

Mercury in.	Milli- bars	Mercury mm.	Mercury in.	Milli- bars	Mercury mm.	Mercury in.	Milli- bars	Mercury mm.	Mercury in.	Milli- bars	Mercury mm.
27.02	915	686.3	27.82	942	706.6	28.62	969	726.8	29.41	996	747.1
27.05	916	687.1	27.85	943	707.3	28.65	970	727.6	29.44	997	747.8
27.08	917	687.8	27.88	944	708.1	28.67	971	728.3	29.47	998	748.6
27.11	918	688.6	27.91	945	708.8	28.70	972	729.1	29.50	999	749.3
27.14	919	689.3	27.94	946	709.6	28.73	973	729.8	29.53	1,000	750.1
27.17	920	690.1	27.97	947	710.3	28.76	974	730.6	29.56	1,001	750.8
27.20	921	690.8	28.00	948	711.1	28.79	975	731.3	29.59	1,002	751.6
27.23	922	691.6	28.03	949	711.8	28.82	976	732.1	29.62	1,003	752.3
27.26	923	692.3	28.05	950	712.6	28.85	977	732.8	29.65	1,004	753.1
27.29	924	693.1	28.08	951	713.3	28.88	978	733.6	29.68	1,005	753.8
27.32	925	693.8	28.11	952	714.1	28.91	979	734.3	29.71	1,006	754.6
27.35	926	694.6	28.14	953	714.8	28.94	980	735.1	29.74	1,007	755.3
27.38	927	695.3	28.17	954	715.6	28.97	981	735.8	29.77	1,008	756.1
27.41	928	696.1	28.20	955	716.3	29.00	982	736.6	29.80	1,009	756.8
27.44	929	696.8	28.23	956	717.1	29.03	983	737.3	29.83	1,010	757.6
27.46	930	697.6	28.26	957	717.8	29.06	984	738.1	29.86	1,011	758.3
27.49	931	698.3	28.29	958	718.6	29.09	985	738.8	29.89	1,012	759.1
27.52	932	699.1	28.32	959	719.3	29.12	986	739.6	29.92	1,013	759.8
27.55	933	699.8	28.35	960	720.1	29.15	987	740.3	29.94	1,014	760.6
27.58	934	700.6	28.38	961	720.8	29.18	988	741.1	29.97	1,015	761.3
27.61	935	701.3	28.41	962	721.6	29.21	989	741.8	30.00	1,016	762.1
27.64	936	702.1	28.44	963	722.3	29.24	990	742.6	30.03	1,017	762.8
27.67	937	702.8	28.47	964	723.1	29.26	991	743.3	30.06	1,018	763.6
27.70	938	703.6	28.50	965	723.8	29.29	992	744.1	30.09	1,019	764.3
27.73	939	704.3	28.53	966	724.6	29.32	993	744.8	30.12	1,020	765.1
27.76	940	705.1	28.56	967	725.3	29.35	994	745.6	30.15	1,021	765.8
27.79	941	705.8	28.59	968	726.1	29.38	995	746.3	30.18	1,022	766.6

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Dj. = Djebel (mountain); St. = Saint; Ste. = Sainte; stn. = station.

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